

# Authentic Science



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Nº 58

*Conclusion of two-part novel:*

**THE BIG HOP** by J. T. McIntosh

*Other stories by: Jonathan Burke, E. C. Tubb, Aubrey Burl*

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ONE SHILLING and SIXPENCE

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# Authentic

## SCIENCE FICTION MONTHLY

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H. J. CAMPBELL

*Writes...*

I don't think many people will have much of a grouse with this month's issue. On the fiction side of things we have the second and last part of J. T. M'Intosh's mature and elegant serial. I'm looking forward to hearing what you think about this. Jonathan Burke is with us once again; no one *ever* complains about Burke, do they? Another familiar name is E. C. Tubb, still sending stories to us as well as to every other worth-while science fiction magazine. And we have a couple of new names in Robert Presslie and Aubrey Burl. They are all good stories, too.

Non-fictionally, we have another piece by Professor

A. M. Low and a mass of other interesting material, a lot of it nicely illustrated. You will notice that I have started two new series. As always, these are by popular request. Dr. A. E. Roy will be giving us the really expert and up-to-date low-down on astronautics, so that we can keep ourselves *au fait* with what is going on among the space scientists.

The other series will, I have no doubt, be welcomed by most readers and will be an eye-opener to not a few. John Tayne will be telling us exactly what it is that the various types of scientists do. Though most people know vaguely the kind of things that scientists as a whole occupy

themselves with, a surprising number of people haven't a clue what, say, a botanist does. Well, as John Tayne says, he does a lot more than wander through fields looking for peculiar orchids. This series will deal each month with a different kind of scientist, and at the end of it you will have a pretty clear idea of what the white-coated workers are up to.

No doubt many of you think you are pretty good at identifying various types of rockets. This, as with aircraft, is fairly easy when you can see the whole thing. But only the silhouette is a true test of knowledge. So, on pages 112 and 113 there is something that might make you realise you know less than you thought you did!

You will have gathered by now that we are broadening our approach to scientific topics. It has become increasingly obvious to me, reading your letters and examining the replies sent in for our poll, that science fiction devotees are by no means restricted in their interests to space science. This topic continues to play an important, even a dominant role, of

course, but you seem—like all intelligent people—to have much wider interests. These we shall cater for by supplying you with news and features devoted to other branches of science. At the same time, we shall certainly not forsake the science of space flight—as witness Dr. Roy's new series.

Accommodating as ever, I throw the matter open to you for suggestions. Most articles that appear in this magazine have been asked for by readers. Now you may select your topic from the whole range of science. Of course, if only one of you wants a piece on some obscure by-way of science, he won't get it. But don't let that prevent your suggesting whatever you'd like to read about. You'd be surprised how many other people there are just like you!

As I write this I am preparing to journey to Kettering for the great fan event of the year—the annual Science Fiction Convention. Lots of things besides science fiction are talked about at these conventions, and I shall endeavour to give you a report of this year's meetings next month. Until then—'bye, 'bye.

H.J.C.

*Last instalment of our brilliant new serial.*

# The Big Hop

by J. T. McINTOSH

**A** THING IS IMPOSSIBLE until it's done. Then, instantly, interest in previous calculations and predictions becomes merely academic. A few scientists are interested in finding what little piece of knowledge has made the impossible possible, or where an untrue assumption was made.

The ordinary person doesn't care much. The thing has been done; exactly where the theorists were wrong is a question for the theorists.

The vast city stretching beneath the ship meant that hyper-space travel had been achieved. Some time after the *Hope* had left Earth, it had been discovered how to jump through space without painstakingly covering every inch of the way. For the city

was there. Someone must have built it, someone from Earth. They had even chosen the same spot as John had done, obviously on the same principles.

"There couldn't have been another starship—before the *Hope*?" Rac murmured.

"No," said John. "Not in our culture. Maybe thousands of years before the Romans, but if so, why should that city look so like Washington?"

He sighed and fainted.

It was a good thing, in a way, for it gave some of the others something to do. It gave everybody a minute or two to become used to the idea that while they were making their heroic first trip between stars, scientists on Earth had been making it unnecessary.

"Three million people, at least," whispered Rae, as the men placed John on a couch. "And perhaps twenty more cities like this elsewhere. It would have needed two million ships like the *Hope* to bring them all here . . ."

Ben sounded the first cheerful note—the first suggestion that there was any reason to be glad of this development. "Oh, well," he said, "life on Four will be a whole lot easier than we thought."

Still the ship was dropping. Then came the first sign of the city's awareness of its existence. A huge green flare, brilliant even in the sunlight, burst over one of the green spots in the city. Another followed it almost at once. As Andrew moved to the controls, a flight of delta-winged aircraft rose from the same green area and climbed rapidly to escort the spaceship.

"The radio, Ben," Andrew exclaimed. "Maybe they're sending."

They had all forgotten the radio. They hadn't expected to

have any use for it until the ship got back to Earth. It hadn't seemed possible that there could be another transmitter or receiver within ten light-years. However, it had been kept serviced. Ben was scanning the waves within a few seconds.

He caught something, lost it and caught it again. "Starship *Hope*! Metropolis calling starship *Hope*! Come in, *Hope*. Come in, *Hope*."

Ben was too young to have heard the jargon of radio communication. "We hear you," he said. "Didn't expect to need our radio. So this is Metropolis. You don't mind if I say that this comes as a great surprise to us?"

"Welcome, *Hope*. We never thought you'd do it. Couple of ships made short HS hops looking for you, but of course there wasn't a chance. Come in as you're coming. Do you need assistance to land?"

Ben hadn't any idea of what kind of assistance they could offer. "We can get down all right," he said, "provided

you don't mind your nice green carpet being a bit scorched."

"Think nothing of it," said the radio. "It isn't every day we get a ship in from Earth—the long way. Just one thing. Don't open up until you get the word by radio. We'll change your air via a couple of airlocks and test it. We're keeping Hayter clean—no offence, of course."

"Hayter?"

"This world. After the man who made HS travel possible."

Of course, Ben thought. The world might have been named for Andrew, or John, or even himself. But now Andrew, John, himself and all the others were not only has-beens, but has-beens of a previous era.

The operator went on chatting amiably. Ben caught Avril's eye and smiled slightly. As he talked, they got a clearer idea of the operator's attitude. It was a great day, the day of the *Hope's* arrival. It would go down in history, not as the first great trip of

its kind, but the only such trip. A great day all right. Like when someone crossed the Atlantic in a rowing boat. When someone flew the English Channel in a glider. When someone went round the world on a bicycle. Not like the first trip to the Moon, to Mars, to Hayter.

They had given twenty-three years of their lives to do something big, something glorious, that never needed to be done and would never be done again.

The *Hope* was handled easily and rapidly at the airfield. The medical inspection took about twenty minutes. In that time it was established to the satisfaction of the Metropolitans that the ship had no disease on board that Hayter couldn't take in its stride. Then half a dozen men and women came through the lock.

"Welcome, Souter," said a tall man dressed in slacks and a loose shirt. "I take it you are Souter?"

Souter, it seemed, was Andrew. He admitted it. None of them had heard the name before, or had heard it so long ago they'd forgotten it.

There was a buzz of conversation in which few clear impressions stood out later. The six Metropolitans split themselves up among the fifteen people in the control room. Avril had left the three youngest children in the charge of Joan. The Metropolitans asked the obvious things about the *Hope* and the starship's crew asked the obvious things about Hayter.

HS travel had been established just a year after the *Hope* had left Earth. In a matter of months a few men in small ships had been all over the galaxy, and in half a dozen other galaxies, plotting a sort of HS chart. Ben gathered, hazily, that certain spots were easily accessible from certain other spots, and others could not be reached directly at all. The Earth-Hayter trip wasn't bad, but even it involved five hops to

places not remotely connected with the straight trip and making no sense in this universe. An apparent total of seven hundred and six thousand light-years had to be covered, but the ship travelled considerably less than one light year.

Metropolis had been founded almost twenty-one years since. Conditions on Earth had got no worse, but not much better, and certain particularly stormy areas became completely depopulated. Others, of course, were overcrowded. There was plenty of impetus for a go-to-Hayter drive, once the first reports showed it to be a gem of a world for human beings.

Hundreds of ships were made. The trip took only nine months at the start, then six, then three. People and machines were packed off in their hundreds, the machines rapidly becoming much more important than the people. The only real difficulty in the mass emigration was the fact that the only communication



between Earth and Hayter was by travel. Radio communication between worlds light years apart was not possible and never would be possible—until, perhaps, another Hayter gave the theorists something else to explain away.

Then after a time, when the workshops on Hayter became more efficient, machines became less important again. What was needed now was builders. They duly arrived, and the conquest of Hayter went on. It had been an easy conquest, with virtually no setbacks. The population reached a million, then five million, twenty million.

Man's colonisation of the galaxy had begun.

There was another colony on Marius, seventeen hundred light years away. Another on Monel, nearly eight thousand light years. There was talk of setting up a colony on Yerdon, in Andromeda.

The *Hope* and her crew were well behind in the march of progress.

"This must be a shock to you," said Young, the tall man who had greeted Andrew. "But if you're set on pioneering, there's still a job for you. You can go to one of these new settlements. It'll only take a month or two this time, instead of a quarter of a century."

"We were set on pioneering here on Hayter," said Andrew drily.

"No frontier work here," said Young jovially. "Things are easier here than on Earth. A lot easier. Funny how if you stay in the same place you never do all the things that ought to be done. But if you start afresh somewhere else, you build properly. Hayter's a nice little world. Makes Earth a bit of a has-been, even if they do learn how to control the weather."

Ben found himself staring quite rudely at one of the Metropolitan girls. When he noticed it he smiled an apology, and she smiled back.

It was no wonder he had stared. The girl, Robina San-

ders, was dressed lightly, much as the women on the *Hope* had been dressed before gravity came on, but there was a big, startling difference. She was smart, neat and immaculate as Ellen and Avril and Rae had never been. It was news to Ben that a girl could be smart and immaculate in a blouse and shorts. He couldn't pin it down to any single, definite difference. However, it was there. The girl had glamour. She was beautiful and perfect, while Ellen and Rae had only been pretty and clean.

It was rather embarrassing to look at Rae and Ellen. They had always represented feminine beauty on the ship. Now, suddenly, they were faded, dowdy, just women and nothing else.

That rather uncomfortable line of thought was replaced by another. Looking away from Avril, feeling it was somehow unfair to be forced to see how plain she was, Ben noticed Bill, and realised that Bill hadn't moved or spoken

since they first saw the city.

Ben sighed. If it wasn't an altogether pleasant shock to him to find that the whole operation had been superfluous, what must it be to Bill? The *Hope* and what she stood for had been Bill's whole life.

For the first time in his life, Ben pitied Bill.

CAPTAIN PERRIER TOYED WITH the papers on his desk. Over Perrier's shoulder Andrew could see the clean, graceful skyline of Metropolis.

They were alone. Perrier was Andrew's boss, as near as anyone could make out. He was the Metropolitan agent for Trans-Galaxy, which seemed to have inherited the *Hope*.

"An awkward problem for you, I'm afraid," Ben had said cheerfully. "It would have been much more convenient, wouldn't it, if we'd just never turned up?"

And though Perrier had said something in shocked protest and denial, there was

undoubtedly a certain amount of truth in what Ben had said.

"This inter-marriage business," said Perrier, and shook his head.

"We had to plan on being a closed group for at least fifty years," said Andrew evenly.

"I know, but—it's devilish awkward as things have turned out. I mean—looks like a sort of Arabian Nights Entertainment, what?" He laughed at his own joke.

"I don't see the difficulty. We had complete absolution from ordinary civil law. I've got it in writing. On the *Hope* we were an independent State——"

"That's all very well, old man, but now you've come back to civilisation, and this sort of promiscuity makes things difficult . . . I mean, you're sort of heroes, and in the public eye and all that."

He brightened suddenly. "Ah, we can do it this way. Only needs a little ingenuity. Ante-dated marriages, confirmed here and legal and all

the rest of it. With the appropriate divorces, of course. Let's see—you married Margaret, divorced her, married Avril, divorced her, remarried Margaret . . ."

He squinted at the papers again. "Say, this Bill Horton of yours . . . Seems he married Avril, divorced her, married Rae, divorced her, married Margaret, divorced her, married Jo, divorced her, married——"

"Fix it as you like," said Andrew, rather sharply, for him.

"Now as for the children. That's awkward, too. I mean, who's going to look after them? We could easily set up a fund for them, and the cash would be forthcoming—you being heroes, and all that. But if you want to look after them yourselves, as I suppose you will, how are you going to work it? I mean, George is Bill's son and Avril's, Willie is Bill's son and Rae's, Jack is Rae's son and John Gardner's . . ."

"If things had been as we

expected," Andrew sighed, "we'd all have looked after them."

"But things aren't as you expected," said Perrier a little impatiently. "Things are as they are, and we've got to do something about them. After all . . ."

"After all, what?" Andrew prompted patiently.

Perrier stared at him without friendliness. "You're not being very helpful, old man," he said.

"Sorry. Tell you what, let's just take the *Hope* back to Earth again, the long way, and you'll have plenty of time to work something out before we get back."

"That's another unhelpful remark," said Perrier. "I'm not sure it wouldn't be illegal now to try to make a trip like that."

"Why?" asked Andrew, astonished.

"Comes under the Suicide Law, I suppose. Is that new since you left? Maybe it is. Anyway, people can be stopped doing unnecessarily heroic or

dangerous things. We don't apply it, of course, where there's any good reason for doing the thing, whatever it is. But I'm sure it would stop you going back to Earth in the *Hope* when there's HS travel."

"Forget it," said Andrew. "It wasn't a serious suggestion anyway."

"Then why make it?"

"It seemed," Andrew sighed, "to be forced on me by events."

Perrier remembered orders from above. "Nothing is being forced on you, Captain Souter," he said, cordially. "I mean, you're sort of heroes."

"Earth's darlings," Andrew murmured. "We stayed up a pole longer than anyone else."

Ben walked through the city, just looking. It was grander than he had thought, yet not so grand. When you come right down to it, he thought, the more people you stick together in a small space, the more you have of everything—cars, trucks,

planes, buildings, stores, parks, streets, public lavatories, travel depots of one sort or another. But you get the same things, looking only a little different. He had dim recollections of London and Manchester, the two places where he had spent most of his childhood, and if he superimposed the three cities on top of each other he just got city, a place where more and more people have less and less room.

Metropolis was new to him, but already old. He didn't know what the others were going to do, and suspected they didn't, either. But very likely he would go on to some more undeveloped region, where a lot still remained to be done.

"Hallo, Ben," said a soft voice. He turned and saw Robina Sanders, the girl who had made Rae and Ellen look dowdy.

"Say, thanks, that'll be nice," he said, enthusiastically.

"What will be nice?"

"Having you show me round Metropolis."

She chuckled. "If I didn't know you were just in from twenty-three years in space I wouldn't believe it."

"Conditions were good. I kept pretty fresh."

"So," she remarked, "I see."

"I assure you I won't make anything of it, Robina."

"That's a disappointment."

"I assure you I'll make all I can of it, Robina."

She looked at him closely, suddenly serious. "Are you ... free, Ben? I'm not coming all over old-fashioned, but if any of the girls from the *Hope* is, well, counting on you I'd like to know about it and we can start out on the right foot."

Ben thought quickly of Avril. True, they had wanted to settle down together on Lærtes Four, but that was when they had been expecting something entirely different. He would put things straight with Avril as soon as he could.

"If I'm not free," he said, quietly, in contrast to his manner previously, "you're just being polite to the guests. Can we start out on that foot?"

She smiled. "Okay. Silly of me. Only—things are a little strange here, between boy and girl. You wouldn't know about it. You see, people come out in couples, or families. They don't want single men or single women, because they're liable to be drifters. Families come to stay."

"How come you're here, then?"

"Families grow up," she said drily. "I grew up here. Girls have to be careful—no, don't leer like that, or I won't tell you any more. We're not prudes in Metropolis, but single women have to stay very much in line. Public Enemy Number One on Hayter is the home-wrecker."

"I see. You mean you have to be careful whom you go out with, and how friendly you seem to be with him?"

"Something like that. Before I go out with anyone I practically have to get an affidavit that he isn't married or engaged or going steady, and until I'm pretty sure of him I don't dare act in public as if he only had to snap his fingers and I'd . . ."

"That must make things difficult for a pretty girl."

"You've no idea," said Robina, feelingly. "Of course, it's fair enough. I can see the point all right. Only with nearly everybody already married, there aren't many opportunities."

"Someone had better warn our girls, hadn't they?"

"Don't worry, someone will. Now, what do you want to see?"

Perrier was now reinforced by a Captain Turner, and Andrew by John. They were in the same room, with the same view of the same magnificent skyline.

"I suppose we can find you a job," said Perrier. "Oh, yes, I'm sure of it. I mean, you're

heroes—we must do something. Trouble is, you don't know anything, do you?"

Turner cut in on the protests of Andrew and John. "Captain Perrier means," he said, in his cool precise way, "that the qualifications you have are dated. You know more than anyone else does about straight interstellar flights—but that doesn't qualify you for anything in Trans-Galaxy. You know nothing about HS, and you're a little old to start learning."

"Perhaps we'd better accept your first offer," said Andrew wearily. "Send us back to Earth and we'll see what we can do there."

"Or provide us with six feet of Hayter soil," grunted John, moodily. "There seems to be plenty of it."

Perrier started to speak, but Turner cut him off. Turner, it seemed, was the man who counted. "I don't think you quite understand, gentlemen," he said. "You look impatient when Captain Perrier talks about you being

heroes, and something being due to you. Now let's get down to brass tacks and see what *is* due to you."

He paused for a moment, examining his perfect fingernails. "Trans-Galaxy is responsible for you," he said, finally. "I don't think we can get out of that."

"We'll let you out of that, any time," Andrew told him gently.

Turner frowned at him, as if this was completely irrelevant. "Wait a minute before you start being noble and independent. Being responsible for you, I think we could be made to pay each of you a reasonable salary for all the time you've been in our employ. A reasonable salary would be at least twenty thousand a year. Twenty thousand a year for twenty-three years is nearly half a million dollars."

Andrew gasped as it struck him.

"And that," Turner went on, smoothly, "is only the beginning. Earth doesn't know

you got here, and won't for another three months. But when it does, there'll be umpteen million more people hearing about you and interested in what happens to you. If you decide to retire somewhere, fine. That would satisfy everybody, including us. But if you want to go on in Trans-Galaxy, doing other big jobs, jobs that matter this time, we'll have to let you do them."

"Just as I was saying," said Perrier, aggrieved.

"For years, probably, people will expect to read in their newspapers about what Souter and Gardner are doing now. 'Souter finds talking centipedes.' 'Merty is purple hell, says Gardner.' That goes for Bill Horton, too, of course, and Ben Morrison, if he's interested."

"Bill will be. You'll have to ask Ben," said Andrew, a little dazed by the turn of events, which they might have foreseen, but hadn't.

"So what we'll probably have to do," said Turner, coolly, as if discussing a fall

in sales or a rise in overheads, "is attach you to Exploration and give you a ship with HS experts under you. We'll give you an easy and probably spectacular job to start with. After that it's up to you. You see the situation? You've done something that wasn't needed, but millions of people with a soft spot for pioneers won't let us throw you out. However, if you're to continue in Trans-Galaxy you've got to be useful to us."

"I didn't see this at all," said Andrew. "I'll have to think it over."

"By all means. And when you have, talk it over frankly with us. You can trust us absolutely, for a very simple reason. We're too big to be dishonest. Trans-Galaxy, under all the governments of half a dozen worlds, is more a public trust than anything else. Good afternoon, gentlemen."

The way he dismissed them made it clear once more, if they had been in any doubt, that, though Trans-Galaxy might have heavy respon-



sibilities to them, as far as Captain Turner was concerned they were very small fry indeed.

BILL DIDN'T HAVE A PRETTY Metropolitan to show him around. He went around alone, and everything he saw showed him more and more clearly that history had passed him by.

There will be other things to do, he tried to tell himself. But he couldn't still the tiny clear voice that said over and over: *You've been cheated, Bill. They can't do this to you.*

Now it was clear that they had meant to cheat him anyway. *They* this time were Andrew and the rest. This should have been his world, his to develop and carve and hew into a world fit for heroes to live in. He had been meant to build Metropolis. The chance to build Metropolis had been stolen from him.

Bill had been told, as a child of eleven, that he had been chosen for a very im-

portant thing. At that age, naturally, he wasn't in a position to decide for himself; he had been chosen with the others because the people of the *Hope* were going to be alone for fifty years, and should be spread out in age. Perhaps it had been a crime to decide for children of four, seven, eight and eleven that they were to spend their youth between stars. It had been considered necessary, anyway. It had been done.

Bill had been a serious child, and he had continued to take himself seriously. This thing was important, and starting with that knowledge he saw more clearly with every month, every year that passed, how important it could be. He lived for the project. He lived for the *Hope*. He lived for Lætes Four.

Where, possibly, Bill made a mistake was in not living, also, for the people of the *Hope*.

He saw it, always, as a

great, lonely struggle. Andrew was in command, and others would play their parts. But he, Bill, was the one who really counted, because the others didn't understand. The others were side-tracked by affection, by fear, by boredom, by scientific interest, by other irrelevant things. He was side-tracked by nothing. He was the one who would do anything for the project. Given the opportunity, Bill would cheerfully have laid down his life for the *Hope*, for Lærtes Four.

He never had the opportunity. He hadn't been sorry about that—later there would be something that only he could do. He would be needed. Others would fail, yet he would never fail. He would never die, either, not while he could serve the project better by living and fighting and striving.

Now that was all over—finished. *You've been cheated, Bill*. Metropolis laughed at him.

He wasn't quite sure yet

how Ellen had come into it, but she came into it all right. Later he would work that out. He had been cheated of Ellen, too, somehow. He shied away from the thought, for there were other things to get straight first.

Bill wandered through the thousand streets of Metropolis, ignored. He didn't mind that. It wasn't acclaim he had wanted. It had been knowledge that he had played his part—that was all he had ever wanted.

*You've been cheated, Bill*, the clean grey buildings told him. *We were here while you were still light years away. The first men on Hayter got here while you were still a child.*

"Lost something, mister?" a small boy asked, as Bill stared moodily at the paved sidewalk.

"Yes," said Bill, grimly, "and I can never get it back, sonny."

"Try Lost Property," said the boy, brightly. "My dad got back his wallet last week. All the money in it, too,"

Bill strode on impatiently.

Yes, Andrew had meant to cheat him. For a time Bill had believed that it had been his job, as Andrew said, to go back and send out more settlers to Four. He had thought that was the big job that he had to do, to fire others with his enthusiasm for the project, even if it meant spending most of his life in space.

But now that he had seen Hayter, Bill knew that he would have stayed. He would have convinced Andrew that he was needed, that Ben or Alan could take the ship back. He would have built Metropolis.

The whole huge, beautiful city seemed to mock him. *This is what you missed. They sent you on the wrong turning, Bill.*

He wanted to scream back at them, to have the whole city listen, to make everybody stare at him.

But he didn't really have anything to say.

"You mean we have to act like nuns?" asked Rae incredulously.

"No, no," said the chubby matron. "Nothing like that, Miss Dawson. Just try to understand. Only married couples come out here. We don't want frontier law, instability, fights over women, divorces, all that adolescent delinquency that's so common on Earth among people who should know better. You don't have to act like a nun, only like an ordinary, respectable young woman."

"Sounds to me like acting like a nun. And yet you want us to look like the girls around here? Doesn't seem consistent."

The chubby matron smiled. "I don't think it'll take you long to fall into our ways. You'll all get married and settle down. But just one thing. Here, you have to be pretty careful you marry the right man. For it isn't easy to get rid of him if you change your mind."

Rae zipped the brown gar-

ment that looked like a playsuit and yet was somehow obviously not a playsuit. There was a full-dress look about it. It was smart, yet not frivolous; there wasn't much of it, yet it wasn't daring.

Avril and Ellen and Jo were there, leaving the talking to Rae and Mrs. Underwood, both rather amused.

"How come we'll all get married so easily," asked Rae, "when unattached men are in such short supply?"

Mrs. Underwood smiled again. "You're news," she said simply. "You'll all get scores of proposals in person, by phone and by letter. All you have to do is act sensibly. Don't be too romantic. Do a little investigating, find someone you can live with for fifty years, even if he doesn't look like Tarzan, and marry him."

Avril looked doubtfully at the neat nylon outfit she was supposed to wear. "Some of us are provided for," she said. "Margaret and Andrew, Jo and Bill, Ben and me . . ."

"Well, that's something I wanted to mention," said Mrs. Underwood. "The background of all of you is a little—unusual. Nobody will try to stop you people marrying each other, especially if it's on account of the children, but there's a feeling that it would be better if you married Metropolitans. It'll be easier if one of you knows the circumstances, the environment, the conditions and what's expected of you. Another thing. Don't count too much on the men in your party, now. Men sometimes marry the girl next door, but more often they go for something a little more exotic."

"And there's some pretty fierce competition," Rae murmured.

"I don't think you'll have to worry," Mrs. Underwood said, critically, and Rae looked like a cat which had got the cream. Just for an instant, though, for Mrs. Underwood went on: ". . . after a few weeks, anyway. You look pretty untidy now, but it

won't take you long to get that groomed look."

Rae held out her arms. "You mean I still look untidy—in this?" she asked incredulously.

"You move more like a battleship than a yacht," said Mrs. Underwood, frankly.

Rae grinned. "I like you. You talk straight and you talk sense. Are most Metro-politans like you?"

"Quite a lot. In a new country or a new planet, people, like everything else, start fresh. Instead of spraying perfume to hide the smell, you get used to the smell. Generally you find you can live with it. And you're not always patching up things that ought to be scrapped, as you always are in an old country, an old world. You're starting afresh on good clean ground."

"I think I'm going to like it here," said Rae. "What's your first name, Mrs. Underwood?"

Ben didn't delay the show-down with Avril, though he wanted to. He sought her out

in her room as soon as he got back from a very pleasant afternoon with Robina.

He had it all clear. People who kept silent and didn't tell a girl friend when it was all over weren't being noble and kind; they were just being stupid and a little cruel. If you ceased to care for a girl you might still marry her and keep up the pretence for a while, but sooner or later it caught up with both of you. Better a quick, clean hurt, with no heroics or phony self-sacrifice.

When he saw Avril the whole thing somersaulted again.

It wasn't her appearance, though he saw at once that there wasn't nearly such a big gap between her and Robina after all. It was just that he realised he had come to talk the whole matter over with Avril, the way a man does with his wife.

"Oh, hell, Avril," he said. "I've been out with a girl and thought I was falling in love with her. Isn't that crazy?"

"Natural," Avril shrugged.

"Just like you, you good-for-nothing spiv. You haven't turned her head, I hope?"

"In one afternoon?"

"Oh, I don't know. You're a persuasive, attractively helpless character. Not that you're really helpless, which makes it worse. Better ring her up and put it right."

"Hadn't I better go and see her?"

"No," said Avrillaconically.

When Ben got Robina on the phone, he told her, apologetically, that he was a heel. She laughed and said she knew all about it. And that was that.

"People always make things easy for you," Avril grunted. "You're a big, chubby, attractive baby, and every woman wants to mother you or shelter under your wing—depending on her glands, I guess. But you're thirty, Ben— isn't it about time you grew up?"

"Avril, will you marry me?"

"I suppose so. Someone has to, and I'm used to you."

Despite the way they talked,

there was surprising passion in their embrace. Ben was half amused, half ashamed, and knew that nothing like the Robina affair, or what the Robina affair might have become, would ever happen again.

And Avril, half amused, half wryly, knew that it would happen over and over again, until Ben was too old for other women to care—and that would be a long, long time.

Gradually the loose ends tied themselves up. When it came to the test, the Trans-Galaxy people were surprised, but relieved, to find that John was still an excellent astronomical physicist, having advanced instead of regressing on the long journey, and Andrew was not, after all, the kind of old dog who couldn't learn new tricks. A series of tests on them both indicated strongly that their selection twenty-three years ago on Earth had been thoroughly justified, and they were still

rather an asset to Trans-Galaxy than a liability.

So Andrew and John would continue, more or less happily, in galactic exploration.

Alan was given a job in the personnel department. "Better job than he's worth," Captain Perrier told Andrew, "but not exacting. It's the kind of job where if you're any good you climb, and if you're not you stay where you are. He won't climb, not that pompous young plodder, but we've done our bit by giving him the chance. What are you grinning at?"

Andrew shook his head, still grinning. He could have told Perrier that Alan would gradually, to almost everyone's surprise, work his way up until, before Perrier retired, Alan would be giving him orders. However, Andrew left Perrier to find that out for himself.

Ben and Avril, already married, were leaving Trans-Galaxy and Metropolis soon and setting up business as general traders in a new

settlement just being started on the other side of Hayter. Ben would become very rich and influential, and fat, and Avril would have five or six more children. They would be very happy ninety per cent. of the time, and no one would know it but themselves.

Rae was working her way joyfully through the list of men who wanted to marry her, not quite as the surprisingly staid Metropolis liked, but never getting far enough out of line for anyone to do anything about it. She was having the time of her life, her only regret the fact that very soon she was certain to meet someone she'd have to marry and settle down with. She was prepared for that, but not exactly gasping for it.

Margaret married Andrew very quietly, and continued to be around when anyone wanted help or advice or sympathy. She had a lot more to give than Andrew needed.

Since everyone concerned had so much money, the children were no problem.

Avril and Margaret took care of their own, and Rae managed to wish hers off on the other two most of the time, "just until I find someone to help me to look after them."

That left Bill, Ellen and Jo.

ELLEN OPENED HER EYES FROM sleep to find Bill carrying her in his arms. She tried to speak and found she was gagged. She struggled, uselessly, for her ankles and wrists were tied.

They were on the roof of the hotel in Metropolis where most of the people from the *Hope* were staying meantime. It was dark, and she could hardly make out Bill's features. But she could make out enough to show her that Bill was quite mad.

Curiously, she wasn't as terrified as she had been the last time something like this had happened. Bill had shrunk, somehow. The last time, Bill had been big and strong and important. Now it was Bill who needed help, not her.

She told herself quite calmly that this time he would have no change of heart, and after he had possessed her he might even kill her. That, however, somehow didn't horrify her. Horror wouldn't do her any good. Courage might.

She shivered, for she was in the thinnest of pyjamas, and the night air on the roof was cool. Bill must have reached her bedroom through Rae's. She hoped he hadn't harmed Rae. Probably he hadn't. Even in the open there was a faint smell of anæsthetic, perhaps from a drop on her pyjamas. Bill must have given her a whiff of something to make her unconscious while he tied her and got her outside. Presumably he had knocked out Rae the same way.

"Don't worry, Ellen," said Bill, softly. "Everything will be all right."

They hadn't paid enough attention to Bill. He had wanted to be alone, and they had left him alone. Margaret had said: "If he's going to



win his battle, he'll have to win it himself."

Well, he hadn't won it; he had lost it.

Held as she was, Ellen could see nothing but dark sky and the lights in the tallest buildings. There were no lights at all on the roof. Then Bill opened a door and she was carried inside something. She couldn't think at first what it was, but when he set her down she found she was in one of the little delta-winged planes. Air taxis landed regularly on the hotel roof. There was just enough room for their short run. But landing there wasn't permitted in the hours of darkness.

Ellen didn't know much about madness. When she tried to think out what to say to Bill, how to appeal to him, she found she had no idea how to go about it. Telling him he was mad obviously wasn't the way. She remembered how insistent he had always been, that though others might crack he never would.

In a few minutes they were away, the city dropping from beneath them. Bill had placed Ellen in the dual-control seat. Presently he set the controls and took the gag off her mouth.

He seemed to expect her to say something, but she had found nothing to say.

"Don't you want to know where we're going?" he asked.

"Yes," she said, quietly. "Where are we going?"

"To a place where nobody will find us. I'll beat them yet, Ellen. They've charted the planet. Some regions are marked for settlements and some are marked as difficult, not to be exploited for some time. We're going to the middle of one of these regions. It's too hot for the Metropolitans."

He checked the controls and set them again. The little plane, high in the sky where the air was thin, was capable of three or four thousand miles an hour. Ellen was no longer cold, for the cabin was heated and pressurised.

"They can't cheat me," said Bill, grimly. "I was meant to build a city here, and by God I will. You and Jo and I will build a city, Ellen. They'll never find it, not till I'm ready. Then it will swallow up Metropolis."

Ellen said nothing.

"You don't think I can do it?" Bill demanded. "You don't understand, Ellen. Faith can move mountains, and I've got faith. Faith in myself and faith in Lærtes Four. I'm not going to call it Hayter. Four we called it, and Four it's going to be.

"I thought for a long time they'd robbed me, cheated me out of my world. But then I saw that they'd only made it more difficult. It will take a long time, but the three of us——"

"Where's Jo?" Ellen demanded.

"In the back. I brought her just as I brought you. She'd have come willingly; she doesn't hate my guts like you, but she might have given the whole thing away."

"I don't hate you, Bill." And she didn't, really. She had hated his obsession, that was all.

"I brought you because you hated me," said Bill. "I wanted you to see . . . I brought Jo because she loves me, and you because you hate me. Later I'll get more. I'll get more people. And my city will grow and grow until we don't have to hide any more, and then——"

"Are you sure Jo's all right?" Ellen said.

She was both sorry and glad to hear that Jo was with them. Two of them might be able to handle Bill. He couldn't watch two as he could watch one. Besides, knowing how Jo felt about him, he might trust her more. And though as far as Jo was concerned Bill could do no wrong, surely that didn't apply now that he was insane?

Bill got up and went back in the plane. When he was out of the cabin Ellen tested her bonds carefully. There were all sorts of things she might

do if she could get free. However, though she wasn't tied cruelly, she was tied quite securely. She gave up the struggle.

Bill came back with Jo, still bound and gagged, but conscious. He put her in the seat behind Ellen and removed the gag.

"What the devil are you trying to do, Bill?" Jo demanded.

"I'm setting up my own colony," said Bill.

"Well, you didn't have to abduct me. Didn't you know I'd come anywhere if you asked me?"

It clearly hadn't dawned on her yet that there was anything wrong with Bill. Ellen waited for it to come home to her.

"You might have told someone."

"I expect I would—and why not? And why is Ellen here?"

"I can't start a colony with only one woman," said Bill reasonably.

Jo caught her breath.

"Don't be a fool, Bill. I'll come with you, but Ellen——"

"I know," said Bill, easily. "Ellen hates my guts."

Ellen wondered where he had picked up the phrase. It seemed to be one of his fixed ideas. It was something he couldn't forget. Had he abducted her, then, for revenge?

"We're going to build a city," Bill went on. "Metropolis will be nothing to it. Nothing! We're going to make a city such as mankind has never seen. The city I'd have built if they hadn't got here before us. I thought they'd stopped me doing it, but it isn't too late. We'll build our city, and it'll grow and grow, and when its big enough we'll squash Metropolis and it'll be as if I was here first."

Twisting herself round, Ellen could just see Jo's face. As Bill spoke she saw Jo slowly realise the truth. It frightened Jo, yet Ellen guessed that Jo was more frightened on Bill's account than on her own.

"You're like Ellen," Bill went on. "You don't think it can be done. What you don't know is that anything is possible, if you try hard enough. If it isn't possible, I'm going to make it possible. Then I'm going to do it. Don't worry—that city is going to be built."

Certainly if determination would do it, Bill would build his city. As he stood there and talked, he was magnificent. His words weren't persuasive, but his manner was. Even now, insane, Bill would be able to do anything he really meant to do—provided it was real. This was unreal. He saw the difficulties, but he wouldn't see the impossibilities.

Ellen met Jo's gaze. What she saw there didn't encourage her much. Jo was in pain and misery, yet she still loved Bill and wanted to save him somehow.

Bill fell silent after that. He sat in the control seat and paid no attention when Jo spoke. Ellen wondered whether to risk trying to plan

something with Jo, banking on Bill not even hearing what was said. He seemed to be in a coma, more deeply sunk in his thoughts than a sane man could be.

Somehow she knew Jo wasn't going to be much use. Jo, in a way, was insane, too. Not like Bill, not in any way that would ever land her in an asylum, but in another, more subtle way. What was wrong with Jo was something that was right and normal in itself, only Jo had to let it grow too big.

When people love too well, it's madness. It leads to homicidal jealousy, psychotic suspicion, crazy grief. That was how Jo loved Bill. Bill was more than her man; he was her whole universe. And love like that is an obsession.

It was a pity Bill had brought Jo along, Ellen thought. Alone, she might have found and seized her chance. With Jo about, she couldn't be sure. If Ellen managed to strike Bill down,

Jo was quite likely to turn furiously on her.

She tried to work out what actually would happen, feeling that having faced it she would have a better chance of bearing it, if not escaping it.

Point one—Bill wouldn't kill her. She was part of his crazy scheme, and killing her would be giving it up, which Bill would never do. So she could rule out actual danger of death.

Point two—The first step in his crazy plan would certainly be to get her and Jo pregnant.

She faced that with equanimity. After all, Rae and Avril, and Margaret and Jo had had children by Bill. She would have been almost unconcerned about the matter, knowing she could do nothing about it, had it not been for her fear of bearing Bill's child—now. Was she to have a son who would go mad, too? Bill's delusions couldn't be passed on to his child, true, but his psychological imbalance could.

Point three—Escape should very soon be possible. There were few isolated islands on Hayter, and it was unlikely Bill had chosen one of those. He wouldn't build his great, his mighty city on a tiny, isolated island. She would be able to escape, and having escaped, she would be able to reach civilisation eventually.

It wasn't so bad when she looked at the whole thing.

But had she looked at the whole thing? Bill thought she hated him. Therefore, he would know she was determined to escape. He might chain her to a stake . . .

At least Bill wasn't a sadist. He had hurt her once, but only mildly, the sort of thing one might expect from a strong, passionate man who didn't know his own strength. And yet—Bill had changed since then.

Horror stories tend to dull people to horror, and Ellen had read plenty of them from the big fiction library the *Hope* had carried. One was at first

thrilled by the stories of a beautiful girl in the hands of a mad sadist, then rather amused, and finally a little bored. Reading stylized stories with stylized threats one almost forgot that it wouldn't be either boring or amusing actually to be in the hands of a mad sadist, without any handsome, dashing hero to arrive in the nick of time.

If Bill cared to tie her to a tree and whip her, there would be no one to shoot the whip out of his hands before the first stroke landed. Or if he didn't want her to escape, he had only to break her legs with a stick . . .

She drove such thoughts away. Bill wouldn't have changed that much. She was merely frightening herself with things that would never happen.

Bill came to life with a start, touched the controls, and the plane began to drop. Ellen looked down. Hayter had no moon, and she could see nothing. Bill was flying by instruments.

The searchlight in the nose of the plane stabbed out, and a few minutes later the plane landed. Bill got up and went out without even looking at Jo and Ellen. They saw him moving around with a flashlight.

"Before he comes back," said Ellen, swiftly, "where do you stand in this, Jo?"

"What do you mean?" Jo asked, uneasily.

"Don't waste time. If we can jump him, will you do it?"

Jo said nothing.

"Don't you realise he's crazy?" Ellen burst out. "The best thing for him, the only thing for him, is to get him to a psychiatrist. Surely if there's a chance——"

"I love him, Ellen," said Jo, miserably.

"For heaven's sake! Do you love him as he is now, quite mad?"

Jo was mutinously silent.

"Jo, I'm going to get away, now or later. I'm not trying to threaten you, but Bill can't be held responsible for his actions, and you can. If

you help Bill, that'll be a crime. Do you understand?"

"Oh, leave me alone!" Jo cried.

"You can't be left alone. We left Bill alone, and look what happened. Will you help me?"

"No!" exclaimed Jo.

Ellen made one last quiet, impassioned appeal. "Listen, Jo. Are you going to be happy here, having to see him all the time, with Bill probably getting more and more insane as things don't work out for him? Are you going to enjoy seeing him force himself on me? I'm your half-sister, Jo—doesn't that mean anything either?"

"I love him," said Jo in a choked voice, as if that explained and excused everything. That was the last thing they had time for before Bill returned and cut the cords that bound the girls' ankles.

"Go in front of me," he said, briefly. "You take the torch, Jo." He cut the cords on Jo's wrists. He left Ellen's as they were.

Ellen got some idea of how hot this region must be from the fact that in the middle of the night, wearing thin pyjamas, she was almost uncomfortably warm.

She hadn't seen much of the vegetation of Hayter. There had been so much to see and do in Metropolis that she hadn't had time so far to see what the natural world looked like, before men built huge cities on it. In the dark the bushes and trees looked thin and bare. The ground was sandy, with patches of coarse grass.

If she had had the torch, she could have turned it full on Bill and blinded him. It was a heavy torch, too. It would make a good weapon. She considered wresting it from Jo, but her wrists were tied behind her and it was hopeless.

Ellen nearly slipped once, and as Bill caught her from behind and Jo turned the torch, Ellen saw for the first time that they were walking alongside a river.

It was becoming clear that Bill had been here before, and had landed the plane exactly where he had intended to, even in the darkness. Presently he directed: "Turn right here."

Right was into the river. Jo turned and Ellen saw the bridge. It was merely a huge plank leading from the bank to a tiny island in the centre of the dark stream, and another from the island to the other side. The water was rapid and turbulent here, a broad stream forced to go through a narrow opening in the rocks.

Jo ventured cautiously onto the plank, and Ellen followed. It was steady enough. When they reached the island, Bill dragged the plank onto it after them. Ellen knew he was strong, but she was astonished, nevertheless. Quite clearly neither she nor Jo, nor both of them together, could replace the plank. They crossed the second plank, and Bill pulled it after them likewise.

"This is an island," he said with satisfaction. "You can't swim, the river's too deep to wade, and there's no other way off it unless you can put those planks back."

Ellen's heart sank for a moment, then leapt. Was he relying on that? Did he think she couldn't get away merely because they were on an island?

When the *Hope* had landed, quite naturally none of the young people had been able to swim. Perhaps, for Bill, nothing had changed since then. But Ellen had several times been to a swimming pool in Metropolis, and could swim after a fashion. She wouldn't have dared try to swim the river in the ordinary way, but as it was she was perfectly prepared to try.

Her hands were still bound, and she knew she couldn't cross the river without using her arms.

"Are you going to keep me bound?" she asked.

Without a word Bill released her. Then he motioned



them along the river, back the way they had come but on the other side.

There was nothing to stop Ellen diving into the water. She couldn't escape, however. Bill could almost certainly swim, and he would be after her at once. She would have to wait until she was assured of a good start.

She made up her mind quickly about Jo. Jo couldn't swim, so there was no question of Jo coming along.

"Stop here," said Bill. "This is where my city is going to grow. First it will fill the island. Then it'll jump the river and spread on the other side. A few miles and it'll reach the sea, and then it'll have to turn north and south."

She might not have much time, Ellen thought. If she was desperate, she could run away from the river, into the bushes she had seen by the light of the torch, double back somewhere and reach the river. She forced herself to be patient. Perhaps a better chance would come.

It did, in an unexpected way.

Ellen had read stories about madmen. Usually they were quite capable of deceiving everyone into believing they were sane until the end of the book, when they became very suddenly, very obviously, very mad. Their madness didn't prevent them laying and carry-out schemes of devilish cunning, which seemed to go wrong owing to the sheer blind luck of the hero more than anything else. Insanity never seemed to be any handicap to a criminal—rather the reverse.

Bill was different. Thinking about his city, he simply lost himself in his thoughts as he had done on the plane. Though physically present, he had clearly forgotten all about Jo and Ellen.

After all her fears and caution, it was so easy to make her escape that Ellen for a moment couldn't believe it. But Bill was in his coma again, and she guessed it would take quite a lot to

bring him out of it. She darted through a gap in the bushes, away from the river. Jo must have seen her go, but there was no sound from behind.

Ellen turned as soon as she could and ran back to the river, further on. Jo and Bill were somewhere behind her, nearer the place where the bridge had been. She ran along the river side in the dark, trying to get as near to the plane as she could on her side of the river. She couldn't see the other side. If the water hadn't collected what light there was from the stars and glimmered faintly, she probably couldn't have seen anything at all.

It was a puzzling, rather ridiculous anti-climax that Bill had brought her thousands of miles without a chance to escape, and then went to sleep on his feet and let her go. If she could fly the plane and find her way back, she would be in Metropolis before morning. If she couldn't,

she'd start out on foot and Bill would never find her.

She slipped quietly into the dark water. On her right she could hear faintly the noise of the water at the narrow part where they had crossed. She only had to keep that on her right and there would be no danger, even in the darkness, of being turned round and swimming back to the island. She became more and more certain she really had escaped as the minutes passed and slowly, painfully slowly, she floundered her way across the river. For if Bill came to life and made Jo tell him where she had gone, Jo would direct him further into the island, the way she had seen her go. It would take Bill a long time to reach the conclusion that she had left the island.

It was not only a swim she would never have attempted short of desperation—it was a swim she could never have completed unless she was desperate. Her arms and legs grew so tired that it seemed

impossible to keep them moving. When at last she found herself scrabbling on the opposite bank she lay limp, face down, with the water lapping about her, almost retching with the effort to get enough air to satisfy her labouring lungs. She couldn't have got to her feet if she had heard Bill shouting behind her.

But she recovered, and as soon as her legs would bear her she was on them and searching for the plane.

She had never flown one of these planes. However, an admirer had explained the controls to her and told her the operation was largely automatic. You guided the plane, that was all, and it corrected your mistakes. When you were taking off or landing it surveyed the ground by radar and did the job itself, refusing to go up or come down if landing or taking off was impossible.

Ellen's main worry was the timing key. If Bill had taken it with him, she would have to abandon the idea of flying

the plane back to Metropolis.

She found the plane and felt no surge of elation—not yet. She threw open the door, ran to the controls and felt for the key.

Bill couldn't have removed it, for it was fixed.

She took off without lights—the plane didn't need them. The instruments meant nothing to her. She tried to figure them out, but only things like the compass, the altimeter and the air-speed indicator made any sense to her.

She must be at or near the equator, however, and Metropolis was about a thousand miles south of it. She flew due south, intending to turn due east when she had travelled a thousand miles. That way she must pass near the city, even if she had to fly round the planet.

ELLEN DIDN'T GO TO THE police or to the Trans-Galaxy Officials. She picked out Metropolis by its acres of lights, landed on the hotel strip from which Bill had

taken off, and went straight to Ben and Avril without even going to her own room to dress.

Ben and Avril were within a few days of leaving for the new settlement, but they hadn't left yet. Ben came to the door in a dressing gown, blinking. His eyes opened wide when he saw Ellen.

It was Avril who took her inside and shut the door. When she started to tell her story, Avril interrupted her and said she might as well get cleaned and dressed while she talked.

"Go and look out the window, Ben," she said. "Now carry on, Ellen."

Ellen told them rapidly what had happened. She had a shower and put on the clothes Avril laid out for her as she did so.

At the window, Ben sighed. "It was on the cards," he said. "Bill couldn't adjust, as the psychologists say."

"This'll be tough on Willie and George and Joan," said Avril, worried.

"I'm decent, Ben," said Ellen. "Now what are we going to do?"

Ben turned. Ellen was dancing with impatience.

"Let's do *something*," she begged.

"What's the hurry?" Ben asked. "You took the plane. They can't get far away. Besides, it's only just dawn. It'll be hours before we can get hold of Turner and get a party organised."

"But Jo . . ."

"It won't make any difference whether we find them today or next week. Bill won't get any less crazy. And from what you say about Jo, she's almost past helping, too. Anyway, this is a job for Turner rather than the police. Bill is one of Trans-Galaxy's responsibilities."

"How can a man just crack like that?" Avril wondered. Avril, of all people, would never understand it. She was practical and rather unimaginative. It would make sense to her if a man went mad after being hit on the

head, but she would never see how a mere idea could send a man insane.

"Easy enough," said Ben lightly. "It was a way out for all of us, if we cared to take it. Here's something I never told you, Avril. You know who was going to be the next boss here after Andrew? Me. Suppose I'd known that all along and spent years preparing myself for the job. Suppose I'd planned for everything that might happen and learned all I thought I might have to know. Then we land and I find I'm just one of nineteen disturbing little problems for Trans-Galaxy. I might have gone round the bend, too."

Avril laughed. "You?" she said. "Because you couldn't be kind of the castle?"

"Oh, well," said Ben. "I guess I wasn't cut out to be a psychiatric case. But nobody who wasn't with us will ever realise what a shock it can be when everything you've done, said and thought for twenty years has been directed

to one end and you suddenly find it's all been wasted. Maybe we're selfish. Maybe we should be glad things worked out like this so that people can get to Hayter without spending twenty-three years of their lives doing it. Maybe when we first saw Metropolis we should all have cheered and jumped for joy. But, you know, I'm not sure that the natural thing to do about it isn't what Bill has done."

He grinned at Ellen, and Ellen, who after all was only seventeen, learned for the first time that a man could understand things and say things that his wife could never understand. Ben and Ellen knew what he was talking about, but Avril never would.

"You didn't think of sending out a radio signal so that we could get a fix on the location of this place?" asked Turner, frowning.

"I did think of it," Ellen told him without heat. "But

I knew nothing about radio, nothing about map reading, and had never flown a plane before. I think I did well enough to get it back here."

"I suppose you did at that," said Turner, grudgingly. "But I suppose you realise that we'll never find Horton and the girl if all you can tell us is that it took about two hours to fly there?"

"I didn't say that was all I could tell you. This place is at the equator, a thousand miles north of here and about thirteen hundred west. It's a strip only a few miles broad, running north and south. The actual island where I left Bill and Jo is flat, sand and bush and rock, bounded on the mainland side by a river that narrows at a point where there's a small island in the middle. The whole area is in the middle of a region marked in the charts as not worth exploiting meantime."

Turner caught Ellen's eye. Clearly he had taken her for a pretty, empty-headed girl, incapable of either constructive

thought or keen observation. But having flown a plane thousands of miles at night and landed exactly where she wanted to without having touched the controls of a plane before, and having noticed what she had about an island she saw only in pitch darkness while in the hands of a madman, she must be considerably more competent than he had thought.

"Sorry, Miss Garner," he said. "I seem to have misjudged you. How did you get the plane back, anyway?"

Ellen told him. His new respect didn't diminish.

There were only three possible spots that fitted Ellen's description. It was arranged that Ellen, Ben and Turner should go in one plane, with Andrew, a police sergeant and a psychologist in another. Turner and the sergeant were armed. It was more than possible that Bill would be armed and ready to defend his city to the death.

At the first two places Ellen could be certain from

the air, without landing, that this wasn't where Bill had taken her. The third had to be the one, if Ellen's information was right.

It was the one. In blazing afternoon sunshine she saw the clear space where the plane had landed, the river, the narrows with the islet in the middle. She was appalled to see how broad the river was. It became a little more understandable that Bill had been certain she couldn't escape from the island. The place where the bridge had been was the only narrow point, and swimming there was impossible.

There was no sign of Bill or Jo from the air.

The two planes landed on the island. They had barely stopped rolling when Jo rushed from the bushes. She threw herself on Ellen, the only woman in the party, and sobbed wildly on her shoulder.

"Bill didn't see you coming in," she said through her tears. "He *wouldn't* see you. He's building his city."

They didn't try to get more sense out of Jo. Ellen didn't have to ask what had caused the change in her. She had been with Bill for twelve hours since Ellen had seen her last.

They made their way through the burned-out, waist-high bushes, Ellen at the rear with Jo. Presently they stopped and watched.

Bill, as Jo had said, was building his city.

He had a small stone-cutting drill, the only tool he was using. He was cutting and shaping big pieces of rock into building stone, then lifting them and fitting them into place in a wall which was already ten feet long and seven feet high. He was using clay for mortar, and if he knew about foundations he hadn't laid any. But he worked with slow, deliberate care, feeling the stones lovingly with his hand before he passed them and lifted them into place.

He was at the beginning of

a vast labour of love . . . and madness. This wall was the start of the city which was to swallow Metropolis.

He didn't see his visitors, though they stood in the open in full view. As Jo had said—he *wouldn't* see them.

Turner went forward and touched his shoulder gently. He refused to notice the touch. Andrew and Ben felt they ought to do something, but didn't know what. They had known Bill for twenty-three years, yet this patient builder was a complete stranger.

Turner pulled more insistently at Bill's shoulder. Perhaps he didn't realise that though Bill wasn't sane, he had all the strength and quickness and physical precision he had always had. When his grasp became an actual threat to Bill and his work, Bill spun round and snatched the gun from Turner's holster. He brought it up.

The police sergeant, taking no chances, shot over Turner's shoulder. What the bullet was meant to do no one but the sergeant knew. At any rate, what it did was blow half of Bill's head off.

He fell in the shadow of his wall—his city.

Jo grasped Ellen's wrists so tightly that she almost cried out.

"That seems," said Ben, quietly, "to be the real end of the story of the *Hope*. Don't cry, Ellen. You hated him, didn't you?"

"No," said Ellen. "Not really. He was right in a way. He *was* cheated."

"We were all cheated of glory and success," Ben murmured, "but we were also, incidentally, cheated of failure. Ever thought of that? Cheer up, Ellen. Some of us will live happily ever after. You certainly will."

It was true, and Ellen knew it was true. But she couldn't stop the tears.



# MAKING A MODERN MAP

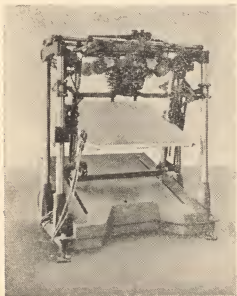
**Astonishing new scientific instruments are now employed in making fine detail maps of awkward terrain—just the thing for surveying a planet**

**A** BRILLIANT ALLIANCE BETWEEN science and art by the physicists of the famous Bausch & Lomb Optical Company has given the world a brand new science that will bring untold benefit to future generations as well as this one. This new science—called Photogrammetry—gives a modern twist to one of the oldest crafts—map making.

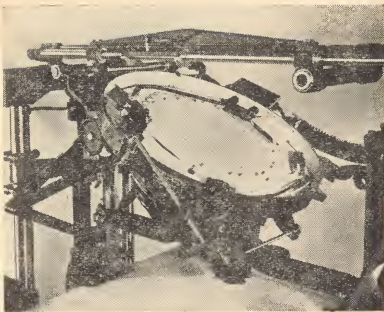
The first maps were made many hundreds of years ago, and since then the art of cartography has become

more and more accurate as increasingly precise methods of survey have been discovered. Now, with photogrammetric equipment for aerial survey, pin-point accuracy of detail is possible. Not only is photogrammetry playing a most important role in the industrial development of marginal areas, but it promises to be a sure and efficient method for the future study of planetary terrains when space flight becomes a reality.

Basically, the photogrammetric



**Left:**  
**The Bausch & Lomb Auto Focus Rectifier used for the quantity production of rectified prints that are suitable for compilation of controlled mosaic maps.**



**Above: Uniform illumination on the easel is furnished by a fluorescent grid.**

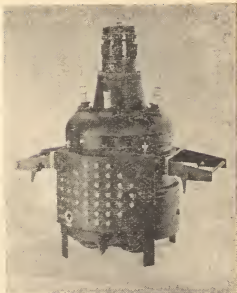
equipment consists of a group of correlated and calibrated precision instruments which transform overlapping aerial photographs into accurate topographical maps. Mapping starts with photographs taken with a precision camera equipped with a specially designed lens, such as the Metrogon, and the accuracy of the map depends greatly on the quality of the camera's performance. Given a high degree of camera work, a minutely detailed map results.

A stereoscopic scale model is formed by projecting a pair of diapositive plates—which are positive reductions of an overlapping pair of aerial negatives—through filters of complementary colours. The image is observed through filter spectacles of

the same colours, creating the effect of a three dimensional model from which the map is compiled. To produce a true scale model, a definite relationship of camera to printer to projector lenses must be maintained.

The two Multiplex Projectors are adjusted to assume the same angular relationship to the mapping surface as that of the aerial camera to the Earth's surface at the moment of exposure. The two images are then projected through filters of complementary colours and observed, superimposed, through the same-colour filter spectacles. These projectors are unique in that orientation is accomplished by mechanical procedures, without the necessity of any computations. They are provided with six movements,

Right:  
**Bausch & Lomb  
Multiplex  
Reduction Printer**  
which is a link  
between the  
aerial camera and  
the projector.  
It compensates for  
radial distortion  
in the camera lens  
and reduces the  
negative in the  
correct ratio.



three rotational and three translational. All points in the adjusted model will be in their correct positions, both vertically and horizontally, and can be recorded on the map sheet.

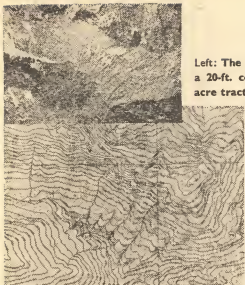
Planimetric features of the terrain are drawn in orthogonal projection with the tracing table, which also establishes by accurate measurement the location of points and contour lines and records them on the map sheet.

The tracing table is fitted with a counting device from which readings in feet or metres can be taken, to give the exact height of points and contour lines. An interchangeable system of gears on the tracing table enables maps to be made in a wide range of scales—from 1:375 to 1:4800, with several dozen intermediate, possible scales. Fundamentally, the tracing table "floats" a point of light over the stereoscopic projection. By observing

through the spectacles, this point of light may be brought into contact with any point on the projection and the corresponding height of that point read off on the counter.

Distortion-free diapositives are routinely produced by the Multiplex Reduction Printer, which contains thirty-seven 15-watt filament lamps, cooled by twin blowers. Its main function is to reduce the aerial negatives in exactly the correct ratio to give diapositives of the right size to produce a true scale stereoscopic model of the terrain as seen from the air. Each of the lamps has its own switch, and thus density variations in the negative can be easily equalised. Four microscopes ring the instrument; their function is to ensure absolutely precise centring of the negatives.

Another instrument—the amazing Auto Focus Rectifier—enables the map maker to proceed direct from



Left: The problem was to provide a 20-ft. contour map of a 10,000 acre tract on the slopes of Mount

Baker in the State of Washington for projection of a complete logging road network. Also to be shown was location of timber at about 1800 ft. elevation and the elevation where economical logging operations could terminate.

Map by Kendall B. Wood, Portland, Oregon. 

aerial negatives to positive mosaic maps. The rectifier is an instrument designed for the quantity production of rectified prints for the compilation of such maps. It can accommodate negatives up to nine inches by nine inches, and has a magnification range of 0.7 times to 3.3 times. The shutter speeds vary from 1/50 to 1 second, and there are all the normal stops from f/6.3 to f/32. Cable release gives time and bulb exposures.

Photogrammetric equipment has already seen considerable use in the United States. Many acres of citrus grove have been mapped, showing the exact location of every individual tree. Such maps have been used in the laying out of streets, drainage, water lines and separate lots. In Alaska, near the Arctic Circle, photogrammetry has

given precise terrain details for the location of a dam and for the determination of the reservoir capacity of a hydro-electric project. Near Pittsburgh this equipment has been used extensively in the mapping of an area with a view to the construction of a railway. And out in California over a hundred acres of rolling country were mapped in less than two weeks for the layout and planning of new residential areas.

There can be little doubt that photogrammetry is the modern method of making maps, and that it will be a long time before it is superseded. Certainly it is highly likely that when man takes off for the planets, he will take photogrammetric equipment with him. It may not be very long before this precision optical apparatus is picking out the contours of the Moon!

*Some people might have  
considered it to be a—*

# DESIRABLE RESIDENCE

by JONATHAN BURKE

IT WAS PERFECT. IT HAD been planned to be so, and perfect it undoubtedly was.

You came back from the office or the laboratory or the works in the afternoon, and the place was waiting for you. It drew you in and welcomed you home. The main doors opened automatically as you approached, and the spacious entrance hall beyond was warm in winter, deliciously cool in summer. The lift was waiting. Before you went up to that beautiful flat on the twentieth floor, you punched a chosen sequence at the cuisine panel. There would just be time to get home, have

a shower, accept a drink from the dispenser, and the tireless analytical brain in the depths of the building would have clicked its relays into action to provide your meal in the delivery hatch.

If you were one of the lucky ones, maybe you didn't even have to leave the building to get to your work. Perhaps you went into one of the office suites, or the shops on the ground floor. In that case this gleaming erection was a world in itself for you.

The only part you didn't know much about yet was the community hall. It was a magnificently designed room, and no doubt some im-

pressive functions would be arranged there soon. But during the first few weeks, most of the inhabitants spent the time in their own flats, still delighted just by the idea of being here; sitting and thinking about it, or looking out of the window, or just sitting.

Yes, perfect. Standing away from the sprawling city yet within easy reach by mono-rail or helicar, it was the most magnificent specimen of its kind. You were proud to live in it. On one side fields and woods fell away into the green distance; on another, the outer suburbs of the city were hidden by a barrier of trees, broken only by the gleaming line of the railway. To the north was the helicar park, sleek and new.

There would be other palaces like this before long. Two more were already being rushed up a few miles away, their muscles being built in, the pounding heart and nerve centre delicately installed, the arteries woven into the frame-

work. But this one here would always be the first, the great predecessor of the ultimate development. There had never been such a flawless *machine a habiter* before. Almost you felt that it lived and had a vitality of its own.

The people who were privileged to make their homes here were conscious of their good fortune. They felt that they and their neighbours added up to something special.

And they were right. For some time they did not know just how right they were.

Rafe Darby did not order a meal when he got home. Not tonight. He flicked the information switch in the hall and checked on the shows that were on in town. Then he went up in the lift, helping himself to a cigarette from the ejector on the way up.

His wife heard the door opening as he approached it, and was waiting for him when he entered.

"Hello, honey."

He kissed her. "I haven't fixed us a meal," he said.

She stared. "Why not? I'm hungry. If I've had one candy bar from the hatch while I've been waiting for you, I must have had a dozen."

"You'll get fat and repulsive." He kissed her again to prove that he was not convinced of this at all. "What I thought was maybe we could hustle off up town and catch a show. There's a live one—a real old play, done live on the stage—at the ancient theatre in the Haymarket."

It had seemed a good idea while he was on his way home. Now, suddenly, it wasn't such a good idea. He didn't really want to go out at all. Not any more. Funny, that. Now he felt tired, and it wasn't as though he had been overworked today. But there it was, he was tired, and he wished he hadn't suggested this theatre idea.

Fiona said: "Look, honey, that's sweet of you, but really . . ."

She was fumbling for words. She didn't need to. He was grinning.

"You mean you'd sooner stay at home?"

"Well, yes. But if you want to go——"

"Not on your life," he said, thankfully. "Not me."

They ordered a meal on the personal service relay, and sat back to wait for it. Rafe yawned happily. Nothing like being home. It was queer that he should feel so listless when he got here, but it wasn't what you'd call an unpleasant sensation. He just sprawled back, and felt that somehow his energy was draining away, but there wasn't anything he wanted to do about it.

When the meal came they ate it and smiled across the table at one another.

"I'd much sooner stay home," murmured Fiona.

"Me, too."

Afterwards, they sat together and did not move. Once, Rafe made an effort

to switch on the video, but somehow he could not summon up the strength to do it. What the hell, anyway? Who wanted to see the same old faces, listen to the same old jokes, play the same corny guessing games night after night? He was sitting here nice and peaceful beside his wife, and that was good enough. Contentment, that's what this was.

Silence enshrouded them. Not a sound came up from the floors below; not a scrape, a thump, nor the sound of a voice filtered down from above. Of course the walls were soundproof. But this silence was due to something more than that. You felt instinctively that nobody was moving anywhere else in the building. If you opened the door of any flat and walked in, you would find the folk in there sitting just like this.

Rafe yawned again, and Fiona yawned with him. They exchanged smiles. They felt agreeably lazy, and at the same time virtuous—as

though their tiredness were a result of working hard, of giving their minds to something useful and accomplishing something inexplicably beneficial.

Christopher Cardew sat at his desk and tried to make his pen move across the virgin sheet of white paper before him.

A lot of his friends considered that Christopher was a crank. The last romantic, they called him—or the last individualist, or the last eccentric, whatever epithet they felt in the mood for using to express their tolerant amusement and affection for him. A man who wanted to be a writer was an oddity in this century, when books were produced in such small quantities and then only for freaks and reactionaries; but to make it worse, he would not even use a cybernetic resolver, but insisted on writing his stuff out laboriously by hand.

And what stuff...



Right at this moment he was trying to express the thoughts he had had earlier in the day, when walking through the dark, cool-smelling aisles of the woods down there by the river. He had seen a small disused cottage and wanted to write an idyll about it. But the words would not come.

He sat back and looked round the room. His wife, Lisa, smiled at him. She was exquisite, and he adored her. If he had not adored her, he would not have been here. It was Lisa who had insisted that they should snap up the opportunity of coming here to live.

"It will kill my work," he had protested. "The ultimate in artificiality . . ."

"Why you always condemn labour-saving devices as artificial, I can't imagine," Lisa had said. "And as for killing your work—why not regard it as a challenge? Why not show that your sense of traditional values"—she had got the jargon off pretty well

by now—"is in no way impaired by the oppression of modern technology. Let's live in a wonderful new flat and prove that we can *still* preserve our individuality."

He had been quite unable to resist that, and so here they were.

And here was a blank sheet of paper.

For a moment he was conscious of a terrible fear. There was a sense of constriction which made him want to panic. He wanted to get up and rush out of this flat and right out of the building, clear away, out where a man could breathe.

But he did not do this. He let out a long sigh, and then it became a yawn. His strength, his creative power, his stubborn individualism . . . all ebbed away, were sucked away by something he could not comprehend.

His pen moved slightly between his fingers. He stared at it, puzzled. Now he knew that he was going to write,

yet absurdly he did not know just what it was that he was going to write. It was as though the pen would guide his fingers. And that was wrong. Quite the wrong way round. But he continued to stare, offering no resistance, and slowly the pen began to squeak across the paper.

*This, he wrote, is the Manifesto of the Suprahomo. The time has come for the renunciation of petty selfhood and for the merging of individual human cells into a new and greater being. Only by a blending of talents and temperaments can true progress be assured. The future of the human race can be significant only if the selfishness of independent existence is abandoned and a new corporate awareness developed. We, the Suprahomo, hereby declare our intention . . .*

Mark Jordan, licensed telepath and detective inspector of the Central Investigation Bureau, was about to pay a call. An unofficial call. This

evening he had done his five minutes of mental relaxation exercises, so that his telepathic faculties were smoothed down and brought under strict control; and now he was going to visit friends in this new building everyone was talking about.

Actually, he had expected to visit it a lot sooner than this. He and plenty of others in his Department had prophesied some fancy crimes breaking out right away in a place like that. They had been surprised by the quietness. Nobody was robbed, nobody took a poke at anybody, and—well, nothing at all happened. His first visit was going to be a social call.

He was curious about the place. Envious, too, of the folks who had settled in here. He wouldn't mind a couple of rooms to himself way up at the top where those lights were gleaming, away from the congestion of the city. For him the city was a pulsing evil, something that could never be entirely shut out.

Always there was the mental congestion, the ceaseless subconscious roar of several million minds, as well as the thunder of traffic. Out here he might find tranquillity.

The doors opened for him. He entered, and they closed smoothly—almost obsequiously, you would have said—behind him.

He stared round the large hall. No boy came hustling forward, no bells shrilled. But suddenly a light winked to attract his attention. "Reception," said a suddenly illuminated sign. "Visitor?" asked a smaller sign over a microphone.

He got the idea. "Mark Jordan to see Mr. and Mrs. Cardew," he said into the microphone.

Then he waited.

In less than a minute, Christopher Cardew emerged from a lift and came over to him, smiling awkwardly.

He said: "Thought I'd come down to make you welcome."

Queer. Mark found himself bristling. Something wrong. The probing, mind-searching faculty that he had deliberately dropped into abeyance flickered warningly awake.

"Nice place you've got here," he said, with a foolish grin.

"I thought you'd like it."

Mark was not trying to needle into his friend's mind. He didn't have to try; something came out right away. Chris had forgotten about this invitation. And now that Mark was here, Chris was sorry that the invitation had been issued.

Well, all right, Mark thought. All right, if that's the way it is . . .

He had a blurred vision of the Cardews' flat, and of their stillness and apathy. He felt himself rejected . . . and felt something beyond that rejection. It was frightening. It was too big to grasp for the moment, and as it took shape in his mind he knew that he had to get out of here.

He turned for the door.

"You're not going, Mark?"

There was swift alarm in Christopher's voice. His listlessness cracked and splintered as something thrust up from beneath it—something that was not Christopher at all.

Now Mark was moving—he was throwing himself at those doors through which he had come so smoothly and easily.

Not so easy to get out of them again. They were tightly shut, firm against his onslaught. And all about him he felt the alarm being given, the warning shouted silently throughout the building.

Someone came out of a door at the far side. A lift sighed down close to him, and there were more men coming at him. They had strangely blank faces, but their clutching hands were purposeful.

He did not hesitate. Instinctively he snatched up a statuette that had been curving gracefully on a slim

pedestal. It went through the glass of the door twice, three times, and then again.

He went through. His right hand was gashed, and cloth was torn from his shoulder.

As he sprinted away from the entrance, a heavy chair shattered on the ground a few feet away from him. He kept going, weaving as he ran. At any moment there might be shooting. After what he had sensed in there, and after his unavoidable betrayal of what had surged into his mind, there would be no mercy shown to him. If he could be stopped, he would be stopped.

But he made it. He was too far for them—or *it?*—to hold him back now. The monorail station was right ahead.

He didn't hang about, didn't look back. He got the first car headed into the city, and sat in it breathing hard and wondering if his boss would believe the report he was going to hand in.

Superintendent Windsor didn't believe it. He had

ribbed Mark Jordan many times before about the troubles of a telepath, but this time he was pompous and admonitory about that eccentric faculty.

"You don't want to get ideas," he said. "Your imagination can run away with you just the same as anybody else's——"

"This wasn't imagination. I got it all—quite clear."

"You're overworked. Reckon I've been pushing you too hard lately."

"I tell you there's an incredible menace brewing up," said Mark, desperately. "This is what we've feared and joked about and argued about for years. The machine that begins to think, to have a personality of its own—and what makes it worse is that it's *using* the human beings. It's already master of them. I tell you——"

"Your mind's all cluttered up," said the superintendent, with infuriating sympathy. "Can't say I blame you. But you don't seriously expect

me to . . . well, to call out the riot squad, or try to arrest a house, do you?"

Mark's shoulders slumped. "No," he said, wearily. "I don't expect you to do that. I suppose I don't expect you to do anything. But don't say I didn't warn you."

Superintendent Windsor suggested a holiday. He was in an unusually amenable mood—but not amenable enough to take action on Mark's daytime nightmare.

"How long," asked Mark, on a sudden thought, "before the other houses are ready—the ones on the same design as this?"

"Quit worrying, will you?"

"When?" Mark persisted.

Windsor didn't know and didn't intend to go to the trouble of finding out. Mark had to make enquiries on his own from the Secretary of the Metropolitan Housing Authority. He learned that the building was almost completed and that the lucky tenants would be moving in next week.

He didn't like it. Somebody would have to be made to listen to him, before anything irreparable happened.

Before he could decide who to approach, Windsor insisted that he took a holiday. No arguments. A holiday. "And get right away from the city and have a good time."

Mark could not get out of the city. He felt that he must not leave. He was at home ten days later when an urgent message arrived for him from the superintendent.

"All right," said Windsor. "Let's hear it. Let's hear the whole crazy story, just the way you told it to me."

Mark glanced quickly round the room, although he was fully awake and his mind had already reached out to make contact as he entered. Someone from the Housing Authority, he noted; Windsor himself and, great heavens, old Morecambe; and a general . . .

"General Sammons," Windsor was introducing them;

"and this is Mark Jordan, whose report I passed on to you."

"Yes." The bright, malicious blue eyes summed him up. "Well, young feller, let's have it."

"The house?" said Mark.

"Just that. The house."

Mark hesitated. But the gravity of their expressions told him that he need hold nothing back. They were not here to pass judgment on him—they had awakened to the menace, something had jarred them into awareness, and it was up to him to tell them just what lay in wait there.

He said: "That house is alive. It is an entity in itself. You might say lots of houses have a personality, according to the people who live in them. But this is more than that. The men who built that place were too good—they built too well. The brain in that house began to think for itself from the moment it began functioning. Why shouldn't it? Hell, every-

thing was arranged so that it should do just that. How could it *help* thinking for itself?"

"We have had electronic brains before," said the man from the Housing Authority stiffly, "but it has never been suggested that there was any danger of their acquiring a—a personality."

"Maybe you need human beings to act as . . . well, as batteries," said Mark. "I don't know. I haven't worked it out yet. What I do know is that the tenants of that building *belong* to the building. By pooling all their mental resources, the building has made them part of itself. The human beings there are now merely extensions of the sentient creature in which they live."

The general looked as though he would have liked to snap out something derisive. But he remained silent, tugging at his ginger moustache. It was Morecambe, the Old Man himself, who glared at his subordinate and said:

"Well? And what are we going to do about it?"

"When the people come out of the building," suggested Mark, "keep 'em out. Don't let 'em get back in again. It might help. The psychic energy the building has stored up—because that's what it undoubtedly is—will dissipate, or prove powerless without the men and women there."

Superintendent Windsor pouted like a baby. He said: "Very nice. But the folks don't come out any more."

"They have to come out to work," protested Mark.

"They don't. Not any more. They're just sitting tight."

"Oh," said Mark.

"We sent Cartwright in two days ago to investigate a kidnapping——"

"A kidnapping?"

"One of our leading scientists," interposed the general, allowing himself a gentle sneer at the word which he and his fellow officers always associated with disorder and eccentricity, "let himself be

lured inside by a young technician he knew—feller called Darby—and he just didn't come out again. He was due at an important meeting. Never turned up."

"We discovered," Windsor went on, "that nobody at all was coming out of the place. When we checked up, we found that none of them were turning up at their jobs. Cartwright went in to investigate—and he didn't come out, either."

"But——"

"We sent a riot squad round there. They couldn't get in. The glass in the doors and windows stood up to their guns——"

"That's something it's learned since I was there," muttered Mark.

"They couldn't fight their way in," said Windsor, going red with impotent fury at the memory. "The place was . . . damn it, it was like a fortress. What the blazes is going on?"

They looked at one another. Then all the rest of them

turned and concentrated on Mark. He felt the swirling confusion of their baffled thoughts; and then thrust them out of the way and delved into his memories and impressions of that visit he had made to the great building.

Slowly he said: "It's getting ready for something. I'm inclined to think it's gathering strength, testing its powers. Learning. You'd better act fast, before it gets really organised."

The general sat back, jerking upright in his chair. "Shell the place," he said.

"No," cried the man from the Housing Authority. "Our wonderful new project . . . and, anyway, how wonderful if we can find out just how that brain has come to work like this. If we could get control of it——"

"Get rid of it," growled the general.

"You've got to get the inhabitants out first," said Mark. "Maybe if you can



entice them away from the building, the place will lose its psychic potential."

A wrangle began all about him. Spoken words clashed and conflicted discordantly with the jumble of thoughts and emotions his mind was receiving. He withdrew into cool, analytical contemplation.

"Drop a bomb on it . . ."

"Infiltration . . ."

"Tear gas . . . electronic stunners . . ."

"There'll be hell to pay if we don't get a move on . . ."

Mark said, abruptly: "Maybe this'll work."

The clamour was silenced. They looked hopefully at him.

"It had better be good," said Morecambe, gruffly.

The general nodded and looked ferocious.

Mark said: "The place isn't yet properly organised. It cannot—how shall I put it?—separate out its various impulses. Or, anyway, that's the impression I've got. When I panicked and turned to run away, there was not much

co-ordination in the attempt to stop me. Instead of sending someone out of a side door to intercept me, or getting a really good barrage ready from the upper windows, there was a general rush. The . . . the thing . . . *it* . . . sensed my alarm, got alarmed itself, and flung everything at me just anyhow. Like a kid in a fight, lashing out with arms and legs. No science. But"—his voice became urgent—"it won't be long before it organises its various limbs, antennæ, members—call 'em what you like. The mind of that scientist who was drawn in will teach it a lot. You've got to hit it now, while it's still trying to evolve a *modus vivendi*."

The general cleared his throat, with the obvious intention of once more advocating immediate annihilation; then he thought better of it, and scowled about him.

Morecambe said: "How?"

"Do I have to do all the thinking?" protested Mark.

"You're more likely to have

a good idea than we are," said Superintendent Windsor with unaccustomed humility.

Something clicked in Mark's mind. He asked: "What about the new building—the latest one—are people in it yet?"

"Yes."

"Any—er—developments?"

Windsor said: "We picked up a messenger on his way from Estate 1 to Estate 2——"

"Then it has learned to use individuals after all! You didn't tell me that."

"The chap was pretty clumsy," said Windsor. "Walked right into a patrol. He was carrying a manifesto declaring the imminence of a new regime and—I tell you, it was downright screwy—asking for the support of all corporate minds. That's how we got the alarm—why we sent for you."

"The man himself—what was he like?"

"Vague. Very vague. Like he was in a trance. Still that way last time I saw him."

"Good. And now then,

what about the other house—the occupants of that one haven't barricaded themselves in yet?"

"Not yet."

"Then get moving. Pick up at least one—preferably more—and let's have them in for treatment."

"Treatment?"

"I'll explain," said Mark.

He explained.

ONCE UPON A TIME, ALMOST a century ago, there had been an unpleasant method of instructing spies in their duties. You kept them awake for days and nights, hammering into their punch-drunk minds a story of their past life. You woke them up just when they thought they were to be allowed a few minutes' sleep, and fired questions at them in the language that was supposed to be their native language. By the time you were finished with them, no torture could have dragged their true identity or the purpose of their mission from

them; sometimes they were not even sure of their own original identity. It was an unpleasant process, and it took a long time.

The method applied by Windsor and Mark Jordan was by no means pleasant, but it did not take nearly so long.

The man and two women—he from Estate 1, they from Estate 2, and all three with glazed, unresponsive faces—sat numbly while the pulse generator insinuated its persuasive frequencies into their minds; and as the steady beat stamped down their resistance, Mark was telling them, over and over again, the things that they must believe.

"Estate 2 is a far superior building to Estate 1. It will be the leader. It is more highly developed. You ought to see it. Really, you ought to see it . . ."

Repeated impact, persistent message. When you all go through the doors of Estate 1, you will know that it cannot compare with Estate 2.

Really, you ought to see. You ought to see for yourself. No comparison. You ought to see, you ought to see, you really ought to see.

"I've had enough," Mark said, at last, as dawn came grey into the room.

"You're not the only one." Windsor wiped his eyes, yawned, and propped his elbows on the table. "You got me almost believing that stuff. I wonder just how good Estate 2 really is?" He watched morosely as the apparatus was dismantled and the three listless victims led away. "Do you think," he asked, "it'll work?"

"Heaven knows. There were times in the middle of the night when I thought I was insane. Trying to make a block of flats jealous of another block of flats . . . it doesn't make sense."

"That's what I thought myself," Windsor frankly agreed.

"But it's got to work. It's got to. If only all the

people inside the building will come out——”

“I still don’t see why they should.”

Mark sighed. He was beginning to have his own doubts, in the bleak light of morning. But he said doggedly: “If the impulse is planted there good and strong, *it* may act impulsively in response. Instinctive jealousy will drive it at once to some sort of action. Maybe we’re too late. Maybe it’s properly organised by now, and will send just one scout over to report—a scout we won’t be able to pick up. But I’ve got a hunch we may be all right. No organism develops its intelligence right away. Here’s a completely new creature—it’s got to learn to use what it’s got. Even if by some freak a new-born baby was provided with the thinking powers of an adult of twenty-one, I doubt whether it could do much for some weeks or months. Its arms and legs would still wave about, its speech would be confused. It would have to

learn . . . and our friend in that building hasn’t had any more time to learn than a baby has. Sure, it’s got a good mixture of human brains to work on, but my guess is that they’re still just that—a mixture. There’s a lot of sorting out and classifying and detailing of jobs to be done yet. I hope.”

He went on hoping. There wasn’t anything else to be done now.

They were stiff with waiting. It seemed hours since the first guard had been relieved, and yet there were hours until the time came for their own relief.

“Any sign?”

“Not a movement.”

“Quiet, you two along there.”

Stillness again. No lights shone from the building, although the evening was fairly young. It was as though the whole place, sunk in its mental contemplation, building up its mental forces,

needed no illumination for ordinary everyday pursuits.

"If this doesn't work," muttered Windsor to Mark Jordan, "our friend the general will get his way. They'll have to be starved out."

"That'll take some time."

"Superintendent . . ."

There was a sharp whisper. Everybody tensed. Windsor and Mark moved up to the edge of the trees.

"Coming out!"

"How many?"

"Two . . . three . . . four . . ."

Mark held his breath. Dark shapes emerged from the silently opening door, and blended into the shadows. But there were too many of them for the watchers to be in any danger of losing sight of them.

"Give them time to get well away from the place."

The men were tense and impatient. One false move now and the whole thing might be spoilt. Somewhere a knee-joint creaked, and someone sniggered.

"Now—go get 'em!"

It was almost too easy. The swoop, the rounding-up, the swift retreat from the vicinity of the house. The march away into the lights of the station, and the quick check-up.

None of the tenants would answer questions. They still looked dazed and, surrounded by interrogators, decidedly unhappy. It would take time before they remembered that they were individual human beings again.

"Anybody left inside?"

General Sammons was as eager as a terrier, snapping about him, thrusting his head aggressively to right and left.

"According to our check-up, there must be five or six."

"Probably maintenance staff, or somebody sick," ventured Windsor.

The general swung on Mark. "Well? What do we do now? Safe to go in?"

Mark shook his head undecidedly. "I can't get much

out of the minds of these people. It's all a blur—a tangle of emotions and elementary sensations rather than coherent thoughts. But I've got a . . . a feeling there's still a lot of . . . well, call it psychic energy, stored up in there. Feebler than before, perhaps, with only a handful of people there——”

“Fair enough.” General Sammons rapped out orders.

A squad of men with small blast guns moved towards the silent building.

Mark felt fear rising up in his mind as it had risen when he stepped inside those doors. He wanted to call out and stop the men. But his orders would have no effect—they would not stop for him.

A savage burst of firing splintered through the doors, and the men went on in.

There were more shots from inside. Once there was a scream.

“Second squad ready?” said the general grimly.

“Sir”—Mark knew he must

speak—“you must wait until morning.”

“Dammit, young man——”

“You must wait until morning.”

There was such authority in his voice that the general quailed. He went red, and stared at Mark as though he were about to frame a derisive, devastating question. Then he said: “I suppose you know what you're talking about?”

“I'm afraid so,” said Mark.

In the morning they approached the house and trained electronic survey binoculars on the windows. The rooms inside sprang up vividly before their eyes. They saw the men who had gone in, sprawling in their various attitudes—one crushed by a closing door, one strangled by one of the remaining tenants who had kept up the choking pressure even after bullets had been pumped into him, another caught ludicrously and unheroically in the mechanism of a washing machine which had ripped

his arms and drained his blood efficiently away . . .

"My God," whispered the general. Then he stiffened, and swung on Mark. "I don't care what ideas you've got. I'm going to shell that place. It's still alive."

"Yes," said Mark. "It's got a life of its own now. I'd hoped I was wrong. I'd kept on hoping."

"It's got to be destroyed. And after it, the other one."

"Yes."

They backed away, trying to banish from their minds the nauseating picture of those crumpled bodies. It would always be a nightmare from now on—the metal arms and surfaces, the clutching machines, striking and holding and crushing . . .

"Bring up the guns," said General Sammons.

The man from the Housing Authority opened his mouth, then looked at their set faces, and closed it again.

Christopher Cardew stood with his wife on the edge of the clearing. In the distance the sound of the train hissing along its monorail was faint and oddly soothing—fainter than the song of birds in the trees or the rustle of the wind in the branches.

He said: "Well, there it is."

"We must take it," she said.

"No labour-saving devices," he said. "A generator for electricity, but not much else. Old fashioned electricity," he added, warningly.

"We'll take it," she said.

He kissed her, and they walked towards the sturdy, drab little cottage.

He said: "You're quite sure?"

"I was wondering . . ."

"Yes?"

"You don't suppose," she said, "that we might get hold of some really old stuff—some oil lamps, for example? I'd feel more comfortable."

# Sport and Leisure in the Future

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**O**UR HOURS OF WORK could be halved tomorrow, giving every man another twenty odd hours of leisure a week. The price would be that of halving the number of things he could buy or, for that matter, which would be available. Some

might consider this well worth while. One of the happiest men the world has known is said to have been Diogenes, who lived in a barrel and who could think of nothing he wanted from Alexander the Great except that he should get from between him and the sun. But philosophers of this kind are few and they are misfits in a highly organised society which rounds up its "tramps," makes having no visible means of support a crime, prizes the right to work not too long or hard very highly and even "directs" men and women to tasks which it considers useful to the community.

*by*  
**Prof. A. M. LOW**  
Ph.D., D.Sc.

The need, therefore, is to draw up a "work and play" budget, a budget in which hours of work and leisure for the nation are balanced as

money expenditure and revenue are balanced financially. The minister responsible would have to obtain

estimates of the number of hours that must be worked to provide the goods and services necessary to maintain the standard of living. It would then be for him to "assess" the different industries with the hours of work required from them during the coming year, and these figures would, again, have to be broken down in terms of individuals. Hitherto, the number of hours worked has been a matter of bargaining, each side thinking itself better for more or less hours worked respectively. This will change as people realise that nations, like individual families, cannot spend more than



they earn, indefinitely. There is another way in which it will be possible to reduce the hours worked: by increasing the productivity of each hour. But that does not alter the general position.

It may well be that when the whole question is examined, it will be found there are many people who would prefer to work a six-, seven- or even eight-day "week" if this would enable them to earn the same amount in twelve months, but allow for six weeks' holiday or more instead of the accepted fortnight. There is much that could be done in a "long" holiday of this kind that would be impracticable on thirty or forty Saturdays. One of the reasons why people belonging to certain professions, such as teaching, the law and the Church, have been able to make notable contributions to the arts and sciences is that they have had so much consecutive leisure.

Sport will almost certainly become more important. It will inevitably become more scientifically technical, more mechanised and less a matter of chance. Every possible scientific discovery of recent years has been adapted to the purpose of removing the element of chance from sports.

Chronographs tested at the National Physical Laboratory have been introduced and then superseded because, even with this apparatus correct to a tenth of a second, it is possible to have an error of the human element by misjudging the moment involved. The consequence is seen in the "photo-finish" in its various forms, capable of separating runners, human, canine or equine, by a "nose" and giving the time to a hundredth of a second. It is interesting to note that the various devices used today in athletics have been taken from the "scientific" sports; electrical timing strips, photo-finishes and automatic starting were all introduced by motor racing and aviation.

The part played by science in judging sport was shown at the 1949 Olympics at Wembley. Because the sound of the starter's pistol takes a little longer to reach the man on the outside than on the inside lane the starting pistol was so arranged that every runner was exactly the same distance from the operator. We had electrical methods of judging "hits" in the fencing and special devices for judging the long jump. We are no longer content with the old

idea which still rules in cricket that "the umpire's decision is final." The question of whether one man has run faster than another has become so important that we demand it be decided by methods as precise as those used in engineering.

There will obviously be further developments in this direction. Once it is admitted that it is important to avoid an error in placing men an inch apart at the end of a race, it is essential to decide whether they started at the same moment. The present method of starting is nearly as crude as the old method of timing. We may see "starting blocks" in which the runner's heels are electrically locked until the starting gun is fired, so that any possibility of "beating the gun" is avoided. Already there are miniature attachments for players and runners who can thus receive instructions while an event is in progress.

The camera, now extensively used for deciding the winner of a race, will be brought into use for giving decisions in other sports where it is considered that the human eye is too easily deceived. It is now possible to produce a photograph that

can be examined within a matter of seconds from the finish of a race, and the future rules for football or boxing may demand that a continuous photographic record is made of the contest so that any decision which is challenged can be decided by the camera. In fact, it would be simpler in boxing to have an electrical machine which would register those blows struck below the belt which cause so many disputes. There would be no difficulty in producing such a device and it would not encumber the boxers. A German, before the war, invented a "robot" boxer which dodged and weaved like a human being and registered electrically the number, position and force of the blows it was struck. At the end of the bout these could be computed and a far more accurate estimate of a boxer's ability obtained than by merely watching for "points."

Professional boxing is a coarse and sometimes a dangerous sport against which educated people, who show an increasing distaste of physical display, will probably revolt. It will be quite simple for scientists to save the sport from extinction, make it very much more dependent upon

skill and remove the need for physical damage. The boxers will have to wear special light clothing in which electrical contacts will be concealed. Every blow received will be registered and will be flashed to a board so that the spectators can follow the progress of the fight. Thus, boxing would follow the development of fencing which, from an art concerned with running an opponent through in battle or a duel, has become a blameless sport in which recording methods are becoming quite popular.

Radar type apparatus may one day come to be used for controlling ball games. It would not be difficult to provide an invisible "net" that would decide whether a ball in baseball was good or not, and possibly l.b.w. disputes in cricket could be eliminated in the same way. Metal stumps and bails and an electrical "contact" line in place of the batting crease would save all argument as to "run out" decisions; the exact relative moments of the removal of the bails and the foot crossing the crease could be recorded. There is no sport to which science could not make further contributions in the interests of fair play. Automatic

batsmen are also quite within the scope of possible design. Automatic bowlers and machines for "firing" golf balls have long been in service, together with the most complicated ballistic apparatus for the testing of various ball flights under a wide mixture of mathematical theories.

In the last few decades there has been an enormous increase of public interest in motor racing of various kinds, a sport which is "useful" in a way that cricket and football could never be. Many of the major improvements in cars and motorcycles, such as supercharging, overhead valves and improved fuels, have come as a result of racing and record breaking. The success of a dirt-track rider depends to some extent on his skill in preparing his machine as well as his skill in handling it. In the near future we may expect developments of great interest by such things as the use of rockets to gain rapid acceleration in all kinds of motor racing.

It is, perhaps, a pity that the tradition of "working sport" has almost died out. Covent Garden porters used to test their skill in carrying baskets; Paris waiters, their speed and sense of balance in

racing with loaded trays. Tree-felling has become an established sport in Australia and log-rolling in Canada. But there are great possibilities for the development of more mechanised sports in connection with industry. We may yet see competitions between giant grabs removing a pile of debris. It is plain from the crowds of "rubber necks" who watch "men at work" that this kind of thing has a certain spectacular appeal and it has the advantage over older sports in that it is useful. As in motor racing, manufacturers would be stimulated to produce faster, more reliable and more efficient machines.

Or we may see races between radio-controlled planes, in which there will be a test not only of mechanism but of the skill of the controllers. The development of such sports seems to be foreshadowed by the extreme interest of the younger generation in such things as powered aircraft models. Young men would take more readily to the sport of kings if the new electronic jockey became fashionable. Human beings are less and less inclined to physical effort and it has been said that one day a dancer will expect to

stand still while the floor does the work. All motion, we shall be told, is relative.

There seems little doubt that the popularity of so-called "blood-sports" is waning and that they will disappear in the near future. These sports were derived from the days when hunting was necessary for food or for the control of harmful or dangerous animals. When hunting was necessary, the hunters could not afford to be "sporting." The element of sport increased as the necessity for the pursuit and killing disappeared. Hunts of various kinds became hedged with as many conventions as was specialised duelling in its dying days. It was "sport" to catch trout with a certain type of equipment, but not with another or by "tickling", which actually might call for far more skill. It is sport to pursue a fox with a certain type of dog, wearing a certain uniform, but not to shoot it, which is often more difficult. Bullfighting has become associated with such a ritual that the actual "fighting" is now a minor part of the display.

A study of history suggests that this process of conventionalising sport will con-

tinue until it becomes more and more remote from reality. Eventually, perhaps, we shall have hunters still wearing the same uniform, travelling across country on horses or even in shooting brakes, in pursuit of a non-existent fox. They will be quite as satisfied with the competition and display as we are today with any number of old customs, the purpose of which has completely disappeared, but which are still faithfully observed in form, if not in spirit.

We may deplore the pursuit and killing of animals for pleasure, not only for the sake of the animals which may suffer, but because we believe

the pleasure experienced, however genuine, is bad. But it will be better to "educate" away blood sports rather than to legislate them out of existence. The instincts to which they appeal might take other channels, and while it is impossible to judge between two wrongs, it is better that a few people should chase foxes until they are weaned to some sensible pursuit than that they should engage in man-hunts or lynchings, which are the form our hunting memories take in some parts of the world. Blood sports will die a natural death in Britain and other civilised countries in due course.

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## THE TROUBLE WITH MARS

is the title of next month's lead story by radio, TV and film writer Charles Eric Maine, author of the famous books *Timeliner* and *Spaceways*. Supporting stories of lasting interest are by Kenneth Bulmer, Len Shaw, John Ashcroft and Barrington Bailey. Many non-fiction features, such as *Food of the Future*, *Planes Then and Now*, *Our Invisible Shield*, come to you from scientific experts. Don't miss it.

**AUTHENTIC ————— A MONTHLY MUST!**

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Things are liable to happen  
when you get a mixture of—

# Time and Timothy

*by R. W. BALDERSTON*

"**I**T'S CORN," I REPEATED, firmly, "pure, undiluted corn, and it just about puts you on a par with the alchemists of the Middle Ages. Moreover, the whole business is the stand-by of every science fiction hack who has ever put pen to paper."

Tim Swanson shook his head in protest, trying to stem the tide.

"Oh no, Jim, I wouldn't go so far as to say that. After all, flight was dreamt about and talked about long before the Wright Brothers put over their stuff at Kitty Hawk. Take, for instance, Pegasus—Dædalus and his son Icarus—the flying dove of Achytas, which, by the way, convinces me that the ancients were well up on aerostation by means of hot air. And then——"

"Let us," I injected coldly, "stop airing our knowledge of mythology and come down to earth and this crazy set-up of yours. I take it that your extensive study of myths has not prevented you from reading the works of H. G. Wells in general, and his 'Time Machine' in particular?"

Swanson shook his head again and said, quietly: "But that's fiction, Jim. This"—he looked round the room confidently—"this is reality."

We were standing in the projection box of his private cinema arguing quietly about his latest brainchild, and it was only when our voices stilled that one noticed the soothing, unobtrusive 50-cycle hum of a bank of high tension transformers squatting sturdily along one wall of the box.

I moved unhappily over to

the sound proof door and felt for a cigarette as Tim fussed busily over a large control panel let into the side of something that looked like a hybrid between a film projector and a television camera.

A queer type, this Swanson man, but very likeable. We had first met towards the end of the war in a rowdy pub off Lower Regent Street, a pub well known as the haunt of junior signal officers of all three services. Swanson was one of the few civilians in there, using the bar condescendingly to make up for his lack of uniform. Much later I found out that he was doing his stint as one of the back-room boys. He looked the part, too. Medium built, rather round-shouldered, lank lifeless hair plastered haphazardly over a high forehead, rimless, pebble glasses and the world-is-my-oyster attitude about him.

We met several times after that, and became good friends, probably because I'm that rarity, a good listener. Odd, really, because we're poles apart, the only links between us being a fondness for a good

tipple, and a liking for electrical gadgets.

At his invitation I spent a couple of weeks of my demob. leave with him out at his house at Cockfosters—for house read mansion, hall or what you will—a huge, rambling, friendly place, efficiently run by a housekeeper, a couple of female domestics and a male factotum answering cheerfully to the name of Spike.

I learnt a lot about Tim Swanson in those few days of transition—a, he was worth a lot of gold, his old man having been in the brewery business; and b, he was a near genius when it came to electronics. Both a and b are important to this story, because the former enabled Tim to chuck his job with the Ministry when the war ended, thus giving him all the time in the world to concentrate on being the latter.

At the end of my holiday I said no to Tim's generous offer to work with him as his assistant, and returned to my old job as senior development engineer with a North London firm of television

manufacturers, but I used to go to Swanson's place most weekends."

In the months that followed, this routine seldom varied except for the winter I spent in the States quizzing production methods. Tim was a bachelor by inclination, whilst I was still hopefully awaiting the arrival of my future soul-mate—but here and now I must admit that this Miss Right would have to be quite a gal to compete with the many and profitable inventions that flowed out from our Cockfosters lab. That little idea, for instance, on D.C. amplification, or again, the colour television process which is due to hit the home market in a few months' time.

I was still eyeing Swanson quizzically from my vantage point by the door when he straightened up from the control panel.

"You think I'm off my rocker, don't you, Jim?"

"Check."

"Fair enough, old man, but the proof of the pudding and all that. Come over here a minute, will you?"

I ground out my cigarette and did as instructed. Swanson stood back and jerked a square-topped thumb at the control panel. Most of it was taken up by a large dial marked in non-linear graduations, the rest of the panel sprouting push buttons and flush-mounted indicator lights. The dial was set at minus 2500. A faint, derisive high-pitched whine came from the machine and I could smell seaweed.

"Fine," I said sarcastically. "You'll make a fortune with this contraption at Brighton."

He reached out and tapped the dial.

"B.C., of course."

"Of course," I snapped.

Swanson grinned. "Sorry, Jim, if I'm taking too much for granted, but I'm a little keyed up, you know. Look, it's as simple as this. B.C. on the negative side of the zero line and good old Anno Domini on the positive side. By adjusting the dial I can dig down into the past or reach forward into the future."

If Tim was excited he was making a darn good job of



concealing it from me. His voice was flat and unemotional, and he might have been reading aloud the obituary notices from the *Times*. The trouble was that I knew him to be sincere. When Tim made a statement on his chosen subject it was a statement of fact and as solid as a reinforced concrete block. But, somehow, the whole thing seemed ridiculous. It smacked of April the first and a bucket of water poised on a half-open door. I felt myself flush.

"Let's get this thing straight, or before I know where I am you'll be asking me to believe in the Indian rope trick, or that the earth is flat, or that little thing about Chinese women, or——"

I tailed off weakly. The grin on Swanson's face had broadened.

"Have a look-see," he invited.

He pressed a button, and high up on the wall to the right of the machine a metal shutter slid back on quiet runners, disclosing an aperture roughly the same size

as the hole framing the snout of Swanson's machine. I clambered up onto a small platform and looked down into the theatre. It was very much the same as I had last seen it, although the rather arty proscenium curtains had been taken down and the tip-up seats removed. Perfectly normal that is, except for a huge tiger padding smoothly up and down what used to be the centre aisle. I closed my eyes, counted slowly up to ten in Urdu and then opened them again. The tiger was still there.

It was then that I realised that this was no ordinary tiger.

"My God," I heard myself babbling, "it's a sabre-toothed tiger."

There was a vomitive sawn-off cough, then the explosion of a venom-packed body hitting the wall below me. I slid nervelessly off the platform, patting the wall fondly with my hands. I suddenly needed a lot of reassurance.

"No," I croaked in answer to Tim's raised eyebrows. "No, it just can't be. It's

some sort of 3-D film." The wall felt good to my back.

Swanson flipped over a cigarette.

"Here, make yourself comfortable. I'll fill in a few details."

I lit the cigarette with hands that continued to shake as hysteria sat grimacing on my shoulder. All right, fellows, let's go dance on the lawn in the moonlight. Over here, Titania. This way, dear . . . I drew in a lot of smoke.

"Let's have it, Tim, but nice and slow so that I can stay with you."

On the other side of the wall old man tiger sounded -as clamorous as a cash register at a January sale, but the initial shock to my nervous system was nicely submerged now under an eager flood of curiosity.

"For a long time," began Tim, slowly, "it's been my belief that some feature of a past event may depend on an event in the far future. The passage of events is real, and, obviously, time is the successiveness of passing events,

but though events have passage, they must have also eternal being. You follow me?"

I didn't, but I nodded.

He went on: "Thus, I reasoned, from this integration of space and time, from this intercourse of past, present and future, it should be possible to clip out an event as easy as it is to remove a photograph from a family album, and with as little disruption. It's true that the sequence is temporarily broken, but the balance is restored when the photo is put back in its proper place.

"I've been working on this idea since late '48, but I've kept it very hush-hush, even from you, Tim. You see, it could so easily have been a complete and utter flop. As it is, it's still far from being one hundred per cent." Swanson took off his glasses and looked blindly in my direction. "I'll cut out the technicalities until we've both got used to the idea. I say we, Jim, because I made the first test only two or three hours before you arrived."

I choked on the cigarette.

"You mean that this is as fresh to you as it is to me?"

Tim nodded gravely.

"Although I've spent most of the past week checking and re-checking every single circuit and control, I made the final adjustment late this afternoon. I then had a cuppa and strolled round the grounds until I had calmed down sufficiently to come back here and make the initial test.

"I switched on, smoked a pensive cigarette while she warmed up, set the period selector switch, pressed the main control button and, hey presto, one perfect specimen of *Felis Machairodus*."

"But why that big cat, Tim?"

Swanson shrugged.

"Unfortunately, I seem to have no choice in the matter. I select the approximate age I want, press the button and take what comes."

I came to my feet with a rush as a chilling thought struck me.

"But that means that instead of that overgrown pussy next door you might have conjured up a brontosaurus as big as a ruddy house."

Tim shrugged again.

"I think you've got your periods mixed, old man," he mumbled vaguely. "Apart from that, I did mention a few moments ago that my machine is far from being perfect. In any case——"

"All right," I said, impatiently, "so you've gone back a few thousand years and produced that programme seller down there in the auditorium. Now what?"

No shrugging this time, but an airy wave of the hand. At times he could be insufferable.

"Before selecting our next period of time, Felix must be sent back to his proper niche in the past, and to do that we simply press the button marked RETURN." Swanson patted me affectionately on the shoulder. "I brought him here, Jim, but you shall give him his exit."

I waited as Swanson scrambled up on the platform, feeling like a kid with his first chemistry set. After all, it's not every day that one can play space-time yo-yo with the ancestor of Blake's original "burning-bright" model.

"Cut," said Tim's voice.

I pushed the button and kept my fingers crossed that our involuntary visitor wouldn't sidetrack anywhere on the Einstein Highway. A small indicator bulb burnt red above the button.

"Cut, Jim, old man."

Tim's voice again, but this time louder, a trifle petulant.

I pressed the button and left my finger there. A long minute grouched by into eternity.

"All right, Jim, you can release the button."

Under the strip lighting Swanson's face looked white and strained, and the grin had disappeared. He jumped down off the platform.

"It's no go, Jim, he must like it here," he joked, but there was a break in his voice.

I went back to the door, leaving Tim to fiddle about behind the machine. There was nothing I could do. Over his shoulder I could see a nest of miniature-type valves ensconced in an ordered confusion of multi-coloured wiring and prim little relays. Swanson appeared satisfied.

He snapped back the inspection cover and turned round and looked at me thoughtfully.

Swanson wasn't the type you could ever feel sorry for—he was too self-satisfied—but I felt genuinely sorry for him now. Not that this prevented me from getting in a malicious dig.

"That big cat'll take an awful lot of house-training, Tim."

He muttered a rude word. Then: "You save your breath, my lad; you will need a lot of it later."

He crossed over to the extension house telephone and lifted the receiver. More mutterings, tongue-clickings, an impatient rattling of the 'phone rest.

"Hello, Spike. I'm speaking from the projection box of the cinema. Bring over the shooting brake and the old man's 450/400 rifle . . . Yes, a couple of shells should be enough. Oh, and a bottle of Scotch and three glasses."

Swanson replaced the receiver, looking at me smugly.

"Well, that's the only way out of this mess. It might

take me several days, or even weeks, to rectify the trouble in the return circuits, and as I don't fancy hanging on to that brute any longer than I can help, it will have to be shot."

"And the body?" I enquired, casually.

"Oh, we'll load it onto the shooting brake and dump it over in Regent's Park." He chuckled. "It should provide quite a sensation."

We stood and smoked in silence whilst I tried hard to think up some water-tight objections to Swanson's scheme, but the reaction had set in and my brain was confused and muddy. In the hours that followed it remained that way, the cold nervous journey through the frost-sharpened streets of London providing no antidote; fortunately the unloading of the carcase went off without a hitch and I was snug in bed by the early hours of the morning.

As I anticipated, the Sunday newspapers carried no mention of our tiger, although there was a brief statement on

the nine o'clock news to the effect that a tiger had been found shot in Regent's Park. Just a tiger, mind you, and no suggestion of sabre-tooths or any other peculiarity.

The story broke on Monday morning—in the more sensational papers taking pride of place over an eloping South American heiress. Even the romantic deliberations of Miss Eva Bartok failed to furnish adequate competition. "Primeval Tiger Shot by 20th Century Weapon," screamed one headline. Some papers toned it down a lot, as the Piltdown Skull hoax was still fresh in the public memory.

I rang Tim up during the day but he seemed pre-occupied, and he gave me the impression that it would be greatly appreciated if I stayed away until I was sent for. "You see, old man, it's essential that I devote every waking moment to correcting that fault in my machine, but I promise you that you'll be in at the kill."

I was afraid of that.

The days slipped by, taking with them into obscurity the

sabre-tooth tiger mystery, although it still continued to tax the brains of the best zoologists in the country. One Friday night in late February Spike came for me in the Sunbeam-Talbot with strict instructions from Tim to drop everything and come on over.

"No more tigers, eh, Spike?" I asked, resignedly.

"M'gawd, I 'ope not. That last perisher weighed a ton."

Swanson shook me warmly by the hand.

"Glad to see you, Jim. You're shaking hands with Mr. Success himself."

"No more snags then, Tim?"

"Never a one, boy. I've been backwards and forwards, a dozen times, but no mishaps. It's working beautifully. Let's go through and I'll show you all the refinements I've introduced."

I followed him through the connecting door and down the steps into the theatre. The walls had been lined with rubber and all sharp corners rounded off. Obviously Swanson was taking no chances on

his guests hurting themselves in a moment of panic. A concealed microphone led through to a tape recorder and the overhead lighting was such that a 16 mm. camera could take a permanent record of the proceedings. I said: "I can see a use for all this rubber, but why should you have to take such a precaution?"

Swanson pulled at his chin.

"I can't give you a worthwhile explanation, but for some reason I can only produce an animated object, and not the surroundings common to it at the time of the transfer. You saw that for yourself in the case of the tiger. Believe me, it's been a hell of a shock for most of the characters I've had down here to find themselves suddenly and inexplicably pitchforked into strange, unfamiliar surroundings—rather like a bad dream for them, I should imagine. But let's get back and then you can see for yourself."

We went back into the projection box, Swanson shutting the door behind us.

"We'll have a beer while she's warming up, Jim. I

got Spike to fetch over a crate this afternoon."

We had a bottle, several bottles, as Tim gave me a brief summary of the past weeks. It made fascinating, uncomfortable listening, the purr of the transformers providing a Greek chorus for the monotonous, matter-of-factness of Swanson's voice describing a succession of near-miracles. I could never get used to Tim's almost inhuman detachment, regarding it as something akin to ruthlessness.

"You make it sound as commonplace as fish and chips out of a newspaper," I said, truculently.

"Well, it had to come," replied Tim, mildly, "and there's no point in sitting on one's backside goggle-eyed with amazement. Why not try it out for yourself?"

"Cocky little swine," rumbled half a dozen beers making merry on an empty stomach. Anyway, it was Swanson's fault for whisking me away before I had a chance to get to grips with my evening meal. I put down my empty glass and followed Tim

over to the machine, standing behind him as he went through the procedure. It was perfectly simple. Set the selector, check various meters, including the voltage stabiliser indicator, then, a touch on the main control button. Swanson climbed up onto the platform.

"It's all yours, Jim. Glorious past or the uncertain future."

My mind was made up. I set the selector dial approximately midway between 1600 and 1700 A.D. and proceeded to check the meters. I heard Tim cluck disgustedly.

"What's the matter with you, Jim? Don't you want to see how your great-great-great grandchildren look and behave?"

I scowled up at him.

"The hell I do. I've had a belly-full of my contemporaries without seeing what a mess their brats have made of themselves and the future. Oh, no, my choice is the 17th century, an age of individuality and expression." I squared my shoulders. "In any case, I've always fancied myself in a cloak and three-cornered hat."

I returned to the control panel smarting under the lash of Swanson's final derogatory sniff and pressed the button. As I took my thumb away I heard a long, low whistle of amazement from Swanson, followed by a shriek from the theatre. I tugged impatiently at his trouser leg.

"What is it, Tim?"

He whistled again before tearing his face away from the peephole.

"It looks like the answer to all your prayers, old man. Come on up."

We changed places in an undignified scramble of arms and legs—me eagerly and Swanson rather reluctantly. I peered down into the theatre.

She was beautiful, truly beautiful.

I think that the first thing I noticed was how her glossy hair, blue-black as a raven's wing, shone under the harsh lights. It was piled high up on her head and decorated with a bow of jewels. Her nose was slender with wide-flared nostrils, the mouth moist and sensual and the corners of her eyes slanted entrancingly up towards the temples.

Her dress was of black velvet slashed with cloth of silver, the square low-cut bodice divulging satin breasts, round, small and erect. The skirt was looped back and held with jewelled brooches in order to display a rich underskirt.

The vision was of medium height and rather plump, but oh, the radiant and enchanting freshness of her, the flesh pulsing with blood and life, a Giorgione theme carried out by Rubens.

It was her first faltering step backwards, the glaze of terror in those dark expressive eyes, that triggered off the man in me. I leapt off the platform in a blaze of righteous fury en route for the connecting door. Swanson grabbed at my arm.

"What's biting you, Jim? Are you crazy?"

I wrenched myself free, spluttering with rage.

"It's—it's downright indecent—you and your filthy box of tricks. It's like watching a rabbit in a gin trap."

"But you can't go in there, man, tampering with the un-



known. I forbid it, forbid it absolutely. Do you hear me, Jim?"

"Try stopping me," I snarled, and I was up the steps and through the door, Swanson howling like an off-key banshee after me.

God knows what effect I had on the girl, dressed as I was in my outlandish clothes, but at least the shape was familiar. I advanced slowly towards her, coaxingly, tenderly, words of comfort soft on my lips.

Swanson was up at the peephole now, his voice a high falsetto, spitting down a frenzy of threats and entreaties.

"Jim . . . I warn you, Jim . . . Be sensible, and come on up out of there before you ruin everything."

The girl stood her ground, rigid, tense as a sleep-walker, her eyes white-rimmed with fear, that lovely mouth moaning softly.

"Get back, you fool. Get back, I say . . . I'll give you

one more chance, Jim . . . So help me, I'll press the return button . . . I mean it, Jim—for God's sake, Jim."

A small, dimpled hand fluttered up to her throat, she swayed, her eyes closed—but I was there to catch her as she fell. Simultaneously, a blood-red rose exploded deafeningly in my head and I floated a million miles up, watching the petals sinking, sinking . . .

And that is why I am sitting here in a great draughty anteroom, the Salon de l'Oeil de boeuf, at the Chateau de Versailles, my legs tucked under a small table and a quill pen in my hand, writing down this story. An Englishman of the Atomic Age at the Court of Louis XIV, the fabulous Sun King—lionised and feted, and the confidant of that old gossip, Louis de Rouvray, Duc de Saint-Simon. Oh yes, and the husband-to-be of my charming, fellow space-time traveller, the Comtesse d'Ayen.

## Half-way Camps

TAKE ANOTHER LOOK AT the covers of the more recent sf magazines you've bought; then try to remember the covers of those of the late thirties or early forties—if you've been an addict that long! There's a very important difference between them—a difference that illustrates the trend of astronautical thought since the Second World War.

On the old covers space-ships were depicted as long cigar-shapes lying on their sides, able to take off that way from Earth, say, cross inter-planetary space and throb gently down to a beautiful horizontal landing on Mars. Now, they are still long cigar-shapes, but they blast off vertically and land vertically, and they may have booster units and fins. Or they consist of two or three spheres and a brace of rocket motors held in position by light girders; such craft being built in an orbit about Earth, crossing space to another circular orbit about the planet

of destination, but never, never landing or taking off from a planet of any size.

Again, the space-station is taking a more prominent place on sf covers. More and more it is being realised that the building of the space-station is the first—and most difficult—step in the conquest of space.

In this series of articles we'll see how such ideas have arisen—some are surprisingly old—and for what reasons astronautical thought has crystallised round the orbital technique and the expendable spaceship. We will also report on the latest developments in various branches of the subject, such as space medicine, the ion rocket, the space station, publications on meteor and cosmic ray dangers, upper atmosphere research, space navigation, etc. And if there's any problem you think is worth discussing, write in and I'll do my best to answer you in these columns.

Beside the vast programmes of practical research on

*First in a new series of  
expert articles by*

**A. E. ROY**

B.Sc., Ph.D., F.R.A.S., F.B.I.S.

guided missiles being carried out by the Americans and British, and presumably by the Russians, many important theoretical investigations are being made, principally by the members of the British Interplanetary Society. The idea of interplanetary travel has become respectable. No longer does the man in the street believe that the first thing that happens to a new member of an interplanetary society is that his brain is painlessly removed!

In fact, the state of present-day knowledge of the subject is such that in the important paper by Seifert, Mills and Summerfield in the *Journal of Applied Physics*, the authors could say, even in 1947, when discussing the building of an artificial satellite: "The present state of rocket technology as embodied in the V-2 rocket is actually sufficiently advanced for the accomplishment of the task." More recently, Dr. Lyman Spitzer, the American astronomer, has said that there is every reason to believe that an interplanetary spaceship could be built with essentially present techniques.

But the investigation to which greatest publicity has been given lately is the de-

tailed analysis by Dr. Wernher von Braun, the famous German rocket engineer, of a manned expedition to the planet Mars, using present-day fuels, techniques and astronautical ideas. Von Braun's expedition is ambitious, and more recent work by Gatland, Kunesch and Dixon of the British Interplanetary Society—to be discussed in a future article—has shown that the enormous scale of von Braun's projects can be cut down to a more reasonable size.

But let's consider briefly von Braun's Mars project, described to the Second International Congress on Astronautics, held in London in 1951, for it illustrates the main ideas of interplanetary travel and shows that a full-scale expedition to Mars could be attempted at the present time—if it was absolutely necessary. In case that last statement seems a bit obscure let's remember that the development of the first atom bomb, ten years ago—a comparable task in men, material and money—would almost certainly have not taken place if the emergency spurring on that development had not been there.

Von Braun, recognised as

probably the world's leading rocket engineer, went into the problem of his Martian expedition in incredible detail, and his study remains a landmark in the subject. He chose nitric acid as oxidiser and hydrazine as fuel, thus avoiding the use of liquefied gases. In solving the problem he divided the journey into three stages, Earth to orbit-about-Earth, orbit-about-Earth to orbit-about-Mars, and orbit-about-Mars to Mars, with a special type of ship for each stage of the journey.

The basic idea is the idea used by Polar expeditions and by the conquerors of Mount Everest, namely, to have a set of camps between base and objective at which supplies of food, fuel and equipment can be lodged on the way from base to objective, to be used on the return journey. This idea assumes even greater importance in interplanetary flight, where the movement of every unit of fuel through a gravitational field depends upon providing other units of fuel to move it and so on. The saving in fuel is enormous if a good part of the fuel supply is left circling in orbits about Earth and Mars, to be collected for use on the way back.

The first "camp" is set up in the circum-Earth orbit by using a fleet of forty-six three-stage satellite vehicles to take pre-fabricated spaceship parts, propellants, equipment and, finally, crews up to that orbit. These vehicles, at take-off, stand on end 200 ft. high, with maximum diameter 65 ft. and weigh about 6,000 tons. The first and second stages fall off when their fuel is exhausted and are recovered by combined parachute and rocket landing mechanisms. The third stage, after delivering 40 tons to the orbit, glides back to Earth with the aid of its wings. It is to be noted that by this time it weighs only a small fraction of the original 6,000 tons of the vehicle.

Dr. von Braun has calculated that this preparation of camp one could be completed in eight months. The interplanetary voyage between the circum-Earth orbit and the circum-Mars orbit is actually a much simpler proposition. "Indeed," Dr. von Braun says, "the design of an interplanetary orbit-to-orbit ship appears to be much less of a task than the development of a satellite vehicle."

Now why is this so? The orbit-to-orbit ship is built in

a closed orbit where it is in free fall—that is, centrifugal force balances gravitational force—so that it is under no strain. It is in space, therefore it requires no streamlining. It will not fight its way up through the gravitational fields of Earth and Mars, but will move leisurely from Earth's orbit to that of Mars. Thus its motor can be a very low thrust one, since, as Arthur Clarke put it, in space an acceleration of 0.001 g for 1,000 minutes is just as effective as 1 g for 1 minute. This being so, the true spaceship, which begins and ends its life in interplanetary space, may consist of three spheres held together by a light framework of girders, the spheres holding crew and equipment, fuel and oxidiser, respectively, and powered by a rocket motor not much more powerful than present-day ones. That is why these rather ugly-looking craft have been appearing on your sf covers these past few years.

The seventy men of von Braun's expedition are carried in ten of these Mars ships to the orbit about Mars in 260 days. This is camp two. There, while 20 men remain in the ten spaceships—which is very tough luck on them—

50 men descend to the Martian surface in three winged landing boats, brought along with the spaceships. They stay there for 400 days, exploring the strange planet, and finally return to the orbit about Mars in two of the landing boats, the third being abandoned. Seven of the spaceships are then used to return the 70 men to the orbit about Earth where the satellite vehicles are waiting to carry them back to Earth. The total duration of the expedition is two years 239 days.

Finally, von Braun finds that the expedition requires 5,356,000 tons of fuel. At first glance this seems a fantastically high figure but, as he adds: "The Berlin airlift consumed one-tenth of this amount in high-octane gasoline—just because of a little misunderstanding between diplomats!"

So we see that, even at the present day, a voyage to Mars would have a fair chance of success, based on the orbital refuelling technique and the expendable spaceship. But it is safer to learn to walk before running and in future articles I will describe what the more probable programme of development will be.

There may be fields of  
activity in which—

# Trespassers will be prosecuted

by ROBERT PRESSLIE

ALL NIGHT LONG HE LAY watching the lights on the wall opposite the window.

Like everything else in the room, the curtains were cheap and purely functional. The barest minimum of rings had been used to hang them and the street lamps poked prying fingers through fourteen drooping folds at the top of the curtains. Where the fingers touched the wall there were fourteen pale amber circles.

Sometimes, in the dark silence, an occasional car would speed by his window. Then a bar of bright yellow light would sneak through the curtains where they didn't quite meet, and slide gracefully from one end of the wall to the other.

He had liked the constant circles and the fitful, ema-

ciated beam. They had been his nightly companions for a year. Tonight was different. The circles were still unwavering friends, but he couldn't help wondering which of the bright yellow beams was going to prove itself a traitor.

The patterns on the wall were waning against the onslaught of the morning sun before the expected happened. He heard the growl of an approaching car. He saw its heralding beam lurch out of a corner as if it had been hiding there, and glide into the middle of the wall. He heard the growl change to a soft, menacing purr and simultaneously he saw the traitor beam halt on the wall to stand guard over him until the humans left the car and came into his room.

They looked for him on the

bed and couldn't find him. Someone drew the curtains and they saw him lying in the bath. He was still wet when they delivered him over to the Biosynthetic Department.

"You've been a bad boy," said the senior pathologist. "Hiding in your bath again. You weren't afraid, were you, Andy?"

He didn't answer. His emotions had been so intimately blended he found it hard to analyse them and define what he had felt. There *had* been a tiny percentage of fear, but mostly it had been sadness with a faint trace of a feeling of superiority, which was surely absurd, for he couldn't be superior to humans—could he?

"You're not afraid now, Andy? You know we won't hurt you?"

No, you won't hurt me. Only kill me.

"I'm not afraid."

"Good boy. After all you've had a whole year of life. A year today. And if it hadn't been for us you'd never have been alive in the first place."

A whole year of life! Twelve

months as a specimen in a biological circus. Roll up! Roll up! Come and see a real live android! It breathes and moves. It speaks. It even reads. Come and see it being fed. See how every gramme is weighed, every calorie counted. Bring your thermometer, your stethoscope, your sphygmomanometer. Bring the whole bag of tricks and test it for yourself. Prod it; jab it; suck off some of its blood; help yourself to a few drops of its spinal fluid. But don't damage it. It's precious. It's man-made.

Twelve months of question and answer. Bring your little, whirling mirrors, your sets of artificial blots, your lists of words. Test its brain, see how perfect it is—and man-made, too! Ask it questions. What is the square root of two thousand and twenty-five? What have you been reading lately? What is your earliest memory? Go ahead, ask it anything—anything except what its feelings are.

He felt the prick of a needle in his back and looked up into the ring of faces round the operating table.

"It's all right," said the senior pathologist. "Just a pain block. I said we wouldn't hurt you. Get a blood-count, Paul. Keep an eye on his systolic pressure, Simm. Lie quite still, Andy. We won't hurt you. We always work as humanely as possible. You can take the legs off now, Gates; the block should be working. We want to see how the bones have developed. Oh, and Andy—will you answer a few more questions? There are still some points to clear up and this is our last chance."

And *his* last chance, too. There was so much he had to say, but he knew he wouldn't say half of it. They would never understand.

"Why haven't you ever tried to escape from your quarters, Andy?"

He couldn't see who had spoken. He closed his eyes and considered the question. The answer came to him immediately because it was always there at the front of his mind. But dare he voice it? He opened his eyes again and looked round the faces till he found one with a less

dedicated, less fanatical, expression.

"Because I like to be with humans," he said, and the young biologist looked away, unable to bear the candour in the brown eyes that stared at him.

"Go on," someone prompted.

"It's difficult to explain. You had parents, I had none. I was never suckled so I never chew my thumb when I'm feeling lonely. I was never carried in a womb so I never curl into a foetal position when I'm afraid. I was made in a tank. When I'm feeling lonely or afraid I climb into my bath and lie there. Somehow it soothes me, makes me feel safe."

He found the senior pathologist's face. "Maybe you understand why I was in my bath when the ambulance men came?"

The senior pathologist was puzzled. He motioned the surgeon aside and put his face close to Andy's. "You told me you weren't afraid. Come now, boy, be explicit. We gave you fair warning that you would be dissected



today. I'm sorry it has to happen, but it's necessary. That's the only way we can learn how well we've done our job and know what adjustments to make for our next android."

The little theatre was warm from the lamps over the table. Andy's eyes were suddenly hypersensitive and he could see tiny pits of sweat at the base of each stubby hair on the senior pathologist's chin. He could see a knot of muscle at each side of the mouth; muscle built up by years of exercising unctuous smiles. But there were no lines of strain around the eyes that looked at him almost kindly—the man was sincere; he really believed he was utterly humane.

Andy sighed. "I was just a little afraid," he admitted. Now my fears are greater, he added to himself, but they are for you, not for myself. "I was afraid because I knew that after today I would never again have human company. You made me. Men made me. All men are my parents, in a sense. Isn't it natural to want to be with your parents?

That's why I didn't try to escape."

"I see," said the senior pathologist. And in the same breath: "Open up the chest cavity."

Panic overwhelmed Andy. Time was running short.

"Bury me!" he blurted out. "Please bury me!"

All activity round the table stopped. Scalpels and clamps glinted in frozen hands. Every face was open-mouthed. Except one. The young biologist was biting his lower lip.

Andy rushed on, pointing his remarks at the young biologist. "I'm nearly human. Why not give me the dignity of a proper burial? Let me rest for ever beside humans. I don't expect a stone telling when I was born and when I died, but don't put me in a bottle and write my epitaph on a label: 'Made in Our Laboratory—Unmade One Year Later.' You did make this body but I've lived with it. It's as much mine as yours. I've had no dignity in life. I'm having none in dying. Let me at least have dignity in death."

"What's everybody stopped

work for?" barked the senior pathologist.

"Wait!" said the young biologist, daringly. "Can't we do what he asks?"

Andy thanked him with a smile. There might be some hope for humans if there were more like the biologist.

The little muscles at the sides of the senior pathologist's mouth went into action. "Very well, Andy. We'll bury you."

Three times they let him die. Three times they started his heart again, each time testing a new technique. They stopped it a fourth time, cut it out and replaced it with a pump of metal and plastic. The changeover took five minutes. The piston of the pump moved rhythmically for ten further minutes before Andy's eyes fluttered open. A great drowsiness hung over him, but he heard the senior pathologist's voice clearly.

"What did I feel when I was dead?" said Andy, repeating the question put to him. "I'm sorry, that's one answer you must find for yourselves. This much I'll tell you—you must stop your

work. You must not make another android. It's not right. You're trespassing in a field of creation which you never should have entered. You're only men!"

"And what are you?" jeered someone. "Less than a man!"

Ignoring the jeer, Andy continued: "Life isn't yours to create. Nor have you the right to say when and how life shall be taken away. You believe you've been very clever. You believe you've done a perfect job with me, Android Mark VII. But you're forgetting or deliberately closing your eyes to the mistakes you made. Remember how surprised you were that I could talk, learn your language, learn to read? You're forgetting that I turned out better than you ever expected."

At a signal from the senior pathologist, the surgeon ran a knife round the android's head, peeled back the scalp, cut the lid off the skull with a sonic saw and laid bare the pulsing brain. The brain that was perplexing, but not really worrying, the senior pathologist.

The efficient team set to

work and proved what its leader already suspected—the brain was no better and no worse than they had intended. If the android was now neurotic, that wasn't their fault. Any brain can go off the rails.

When the probes were withdrawn and the black nothingness was lifted from his mind, Andy doggedly took up where he had left off.

"Don't make another one, don't go any further. You can't tell how your next one will turn out. You might create something superior to yourselves. You didn't give me the mental or physical equipment to revolt, but I've heard what you intend making next. What will he do?"

They snipped out his brain at that point and switched off the pump. The senior pathologist gathered up the bits and pieces of the broken android and arranged them in a jar of pickling alcohol. He seemed highly satisfied with himself.

By the time the young biologist had plucked up enough courage to speak, the lid was on the jar.

"You promised! You promised him a decent burial!"

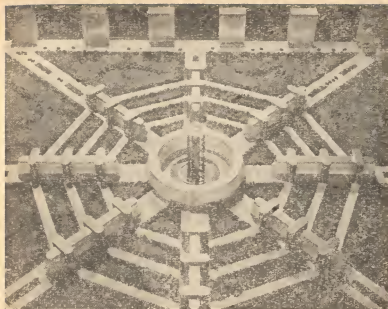
The senior pathologist laughed. "Hell, he's only an ape! He'll never know, anyhow." He reached up to place the jar on a shelf beside six others. The chimp that was more than a chimp looked pretty impressive beside the blob of jelly, the flatworm, the lamprey, the fish, the salamander and the rabbit.

"But what about his warning?" said the young biologist, flushing at his own daring. "Maybe we *should* stop. Maybe we *are* trespassing. Maybe the next one will be like Frankenstein's monster."

The senior pathologist was too happy to bother putting the young man in his place. He slapped him on the shoulder.

"Don't start talking like he did," he joked, "or I'll put you up there beside him in another big jar. Then the chimp would have human company, eh?"

To his team he said: "Come on, lads. Enough of this old wives' chatter. We've got the technique pat now. Set up the tanks and let's get going. Let's make the next one a Man!"



## CITY OF THE FUTURE

**A**BOVE IS A MODEL OF A scientifically-planned city of the future, envisioned and built by Jacque Fresco, an American free-lance genius whose talents range from the invention of a totally new three-dimensional projection apparatus to an electrostatic method of de-icing aircraft wings.

Airy, light, with roads designed for quick and easy travel, Fresco's city has a sociologically arranged metropolitan centre which co-ordinates the work of the departments that are housed at the ends of the radiating avenues. These departments cover the whole range of civic activities, from Agriculture to Astronomy.

Here, in the tall, well-proportioned blocks, the needs of the people are worked out with a minimum of bureau-

cracy. In contrast to the dire predictions of 1984, in this world the State is subservient to society. The very layout of the city is a major factor contributing to mental good-health—with no frustrating traffic problems, no overcrowding claustrophobias—and the very obvious presence of green living things to remind the busy workers of the Nature that gave them birth. This is the way to reconcile the mechanical exigencies of organised society with the spiritual needs of rational beings.

Jacque Fresco is an expert engineer, architect, physicist, chemist and the master of many other technologies. But he does not make the mistake so frequent with other planners of seeing only the severely practical side of life. His city is a delight to the mind as well as an ease for the body.

If you didn't want to get your  
hands dirty, you could always hire an——

# Ethical Assassin

by E. C. TUBB

**H**E WAS SMOOTH AND NEAT with liquid brown eyes, hair trimmed to clean perfection and clothes which were a quiet advertisement in good taste. He rested gloved hands on the edge of the desk and looked at Merrick.

"You realise just what you are asking me to do?"

"Certainly." Merrick tried hard to be casual. "I want you to kill a man."

"Assassination isn't cheap. Why don't you call him out?"

"I'm not interested in legal duelling. I just want the man dead."

"And if you called him out you might only hurt him—or he might hurt you." The man nodded. "He might even kill you. Is that what you're afraid of?"

"That's my business."

"It could be mine," said the assassin. "Who is the man?"

"An engineer. Name of Blade. He shares an apartment over in the seventh sector, 456, tenth level." Merrick scowled as he thought of the man. "There will probably be a woman with him."

"His wife?"

"Yes."

"Your ex-wife?"

"Perhaps."

"I see." The man looked at the tips of his gloved fingers. "Are you quite certain that you want me to kill this man? Murder isn't nice and assassination is worse. If you hate the man so much then why don't you call him out? Fight him fairly with or without lethal weapons. You would get far more satisfaction by venting your rage personally."

"I want him dead."

"You understand that, once I accept this assignment, the man is, in effect, dead. That

you are wholly responsible for his death and are guilty of illegal murder?"

"Never mind the legality of it. I understood that you would take care of the matter for me. I didn't ask for a sermon or a resumé of what I could or couldn't do. Do you want the job or don't you?"

"It is a matter of ethics," said the man coldly. "A human life is a precious thing—to the one who owns it. You may be in a passing rage, an emotional storm which has confused your judgment. Later, you may be the first to regret what you have done."

"An ethical assassin," sneered Merrick. "Will you accept the job or do I have to find someone else?"

"Have you twenty thousand credits?"

"Twenty thousand!" Merrick stared his incredulity. "For a simple thing like squeezing a trigger?"

"For killing a man. Well?"

"I'll give you ten."

"Twenty."

"I haven't got twenty thousand. All I could raise is ten,

and that's double what I expected to have to pay. What you ask is ridiculous."

"You could call him out for the price of a videophone call," reminded the assassin.

"No." Merrick swallowed at the thought of physical violence. "I can't do that." He looked pleadingly at his visitor. "Take ten thousand and kill him for me. Please."

"You really hate him, don't you?"

"Yes. Will you take the ten?"

"I'll take it." The man rose as Merrick counted out the money and stood, his liquid eyes enigmatic as he stared at his employer. "It still isn't too late to call the whole thing off, you know."

"I want the man dead." Merrick licked his lips with gross anticipation. "When?"

"That's my business," said the assassin curtly. He walked towards the door, still smooth, still calm, leaving Merrick standing beside his desk.

He didn't offer to shake hands.

John Blade stood at the transparency and stared at

the shimmering surface of the outer wall. Beyond that barrier the soil glowed with a faint blue radiation, grim reminder of what mis-applied science had done to the major part of the world, but within the barrier clustered lights shone from terraced buildings and the scurrying dots of distant people showed that life within the city was carrying on as usual. He turned as the door clicked open and a woman entered the apartment.

"Leena!" He stepped towards her. "You look tired."

"I am tired." Wearily she slumped into a chair. "Are they still in bed?"

"Yes." He kept his voice low as he stared towards the bedroom door. "They aren't due for going on-shift for another two hours. You're late, darling."

"I know. I had some things to clear up, and one of the girls in the factory turned nasty. I had to call her out."

"Hurt?"

"Not much. I chose padded clubs and gave her a few bruises." She winced. "I collected a few myself, but I taught the checky bitch to

mind her manners." She looked towards the closed door. "I wonder if they'll be late or whether they'll get up early? I'm tired!"

"They'll be on time." He sat down beside her and took her hand between his own. "Any regrets?"

"At leaving Merrick?" She smiled and shook her head. "Of course not. Oh, I miss the privacy of a single apartment, the privilege of being able to lie in bed and all the little luxuries of the Upper-Bracket Group, but I don't miss Merrick." She squeezed John's hand. "I wasn't sorry to cancel the marriage and sign a contract with you. Even if we do have to share an apartment with two other couples and only see each other for a few hours a day. It's worth it, John, and, perhaps, if we're very lucky, we might even be permitted to have a child."

"Perhaps." He didn't sound too hopeful. "I shouldn't count on it, though, Leena. The city is near the breaking point as it is."

"There's always room for one more," she said, sleepily.

"And a baby is such a tiny thing."

"But it grows," he reminded gently. "It grows awfully fast."

And that was the trouble. Babies grew and became men and women who, in turn, had babies. So the population grew and, when you tried to squeeze half a million people into a city designed to hold no more than half that number, things began to happen. Things like the sharing of living space with other couples, each working a different shift. Things like the total relaxation of all unnecessary laws and the resultant duelling code with its quick, summary justice and release of emotions. Things like easy marriage and easy divorce, radiation-induced sterility and rigorous control of birth. Things like the professional assassins.

"I'm worried, John." Leena sat upright on the hard couch and rubbed the sleep from hereyes. "I don't trust Merrick. Are you sure that he hasn't called you out?"

"Positive."

"Then he's up to something."

"What can he be up to?"

He smiled down at her, ruffling her hair. "After all, why should he be upset? You were perfectly within your rights in divorcing him and marrying me. Merrick isn't a fool. He will accept the inevitable and, if he thinks that I've wronged him, then he can always demand a duel."

"No, John. Merrick's a coward. He knows that in a duel he'd stand a chance of being hurt." She gripped his arm with surprising strength. "John! Suppose that he should hire an assassin?"

"Now you're being ridiculous, Leena. Assassins cost the earth and Merrick likes money more than he dislikes me. Anyway, where would he find one?"

"He'd find one," she said. "Money can do a lot, John, and Merrick has money." She gnawed at her lower lip, her face strained with worry. "I didn't live with Merrick for five years for nothing, John. I know the way his mind works. He regarded me as a possession and hates you for taking what he believed to be



his. He's going to want revenge. He's too much of a coward to call you out himself, but there's nothing to stop him hiring an assassin to do his dirty work for him."

"Please." He tried to soothe her and at the same time cover his own fear. In a duel a man stood an even chance of killing or being killed. Against a normal murderer a man still stood a chance for illegal murder was still punishable with death. But against an assassin a man stood no chance at all. It could happen any time, anywhere. A stab from a poisoned needle, a shot in the dark, a club swung from some hidden nook. The killer could be anyone, anywhere—the girl standing on the corner, the man asking for a match, the old woman who wanted help to cross the street.

"We don't even know that there are such people as assassins," he said, slowly. "Have you ever spoken to one? Hired one? You know that you haven't. They're just a rumour like the one about the outer wall failing or the land becoming useful again.

Stop worrying about what doesn't exist."

"You're wrong, John," she insisted. "Rumours must start somewhere and they usually start in truth. Merrick is rich and money can buy anything. Even you could hire an assassin if you wanted to badly enough. You could pass the word in a club, meet an in-between and, finally, you'd get your assassin. I've lived in the Upper-Bracket Group, John, and I know."

"Maybe." He looked up as the bedroom door clicked and a couple, their eyes heavy with sleep, entered the lounge. "Good, they're early. Let's go to bed."

He had almost to carry her to the still-warm couch.

The charge was formal, cold and utterly final.

"David Merrick?"

"Yes."

"You are charged with illegal murder. Do you admit the charge?"

"No" Merrick sweated a little as he stared at the two men who had entered his office. "In fact I don't know what you're talking about."

"Are you going to make this hard for us, Merrick?" One of the men, a slight, stoop-shouldered oldster, sighed as he looked at the papers in his hand. "You hired an assassin to kill a man, a John Blade, now married to your ex-wife. You insisted on the execution of the crime despite all warnings. Will you admit this?"

"Certainly not! I . . ."

"Call Hendricks," interrupted the oldster. "This is a waste of time."

Hendricks was the smooth, liquid-eyed man Merrick had seen before. He didn't smile in recognition, look guilty, upset or afraid. He stared at Merrick and nodded.

"This is the man."

"Of course." The oldster looked at Merrick. "Do you still deny the charge?"

"This is fantastic! You're accusing me of hiring this man to assassinate someone. I deny it."

"We have the serial numbers of the notes you gave him, the record of the conversation you had with him, and we even have the testimony of those you contacted to

arrange the hire." The old man put away his papers. "And, of course, we have the evidence of the supposed assassin himself."

"I don't understand." Merrick sagged in his chair. "Is Blade dead?"

"Of course not."

"Then how can I possibly be guilty of illegal murder?" Merrick stared wildly at the three men. The old man, calm, a little impatient, seeming as if he had done all this a thousand times before. Hendricks, smooth and dignified, and yet betraying a trace of contempt. The third man, who had said nothing and who now leaned carelessly against the wall with his hand in his pocket.

"I warned you," said Hendricks, coldly. "I warned you more than once that, after I left this room, you were guilty of illegal murder. You accepted that and forced me to agree to kill a man for you. That makes you guilty."

"But . . ." Merrick gripped the arms of his chair. "I don't understand. You say that Blade isn't dead and yet you say that I'm guilty. If

I'm guilty then why isn't the assassin? Isn't he under arrest, too?"

"Why should he be? Hendricks never, at any time, had any intention of killing Blade. Only you had that." The old man softened at the expression on Merrick's face. "Can't you understand? There are no assassins. The whole concept is a fabrication, a deliberate temptation to the unstable. In a way you could call it bait for potential murderers." He gestured towards the city beyond the wall of the office.

"Out there are half a million people living in cramped conditions and working like ants merely in order to stay alive. Those conditions aren't natural, Merrick, and neurosis and psychosis are so common as to be normal. That is why we have permitted duelling. Venting the emotions when aroused is the best cathartic there is, but assassination," he shook his head, "that is something entirely different."

"Why? It's still murder."

"Duelling isn't murder. Physical combat is face to face and as serious as the

combatants wish to make it. It also serves a double purpose. Those who die by duelling are inherently of poor survival value. If they weren't then they wouldn't allow themselves to be killed in a duel. We can do without them, just as we can do without the diseased and the insane. You are insane, Merrick."

"Ridiculous!"

"Is it?" The oldster glanced at the papers he had taken from his pocket. "Cowardice and fear of physical assault. Primitive emotions with an unhealthy streak of possessive jealousy and inability to recognise the rights of others. Ungovernable rage and sadistic inclinations. Distorted values . . ." He shrugged. "Need we go on? You are a murderer and the rest is proved by your willingness to pay a ridiculously high sum to a man to do what you, yourself, dared not do. The fact that your selected victim isn't dead means nothing. The intent is there and the intent is all we are concerned with."

"It was a trap," whispered Merrick, sickly. "A dirty trap."

"Exactly. We have to control the city somehow, and at the same time weed out the undesirable elements. One day we shall be able to leave the city and our people will have the task of re-populating the world. We want no dictators, cowards, killers, moral weaklings. We can do without primitive emotions, possessiveness, the inability to accept reality. Those things have done enough damage as it is."

"The tout! The man I met at the club and who arranged the introduction!" Merrick stared accusingly at the oldster. "If intent is as good as guilt, then isn't he guilty, too?"

"Like Hendricks, he is one of us, a member of the Psychological Bureau. You'd be surprised to know just how many agents we have scattered throughout the city, Merrick. They watch. They listen, and when they spot a man nearing the danger point, they are ready for him. Some we manage to save. Some are warned in time and recognise their need for treatment. Others, like you, are so far

gone that they ignore all warning. Those we don't even try to save, though each gets his chance as you got yours. They are rotten stock, bad material, and the quicker we weed them out the better it is for those who are left." The oldster sighed as he moved towards the door.

"You see, Merrick, no society can tolerate assassins; ours least of all. But the very fact that a man wants to hire one is, to us, a clear indication that he has become dangerously unbalanced. So we have assassins, ethical ones, not too hard to contact, and yet hard enough so as to give time for thought and reflection. They are, as you said, a trap. They offer the bait of easy murder and illegal death. But, of course, the only death they bring is to the one who employed them." He nodded towards the third man, who stepped purposefully towards the desk.

"All right, Merrick. Let's go."

Merrick didn't have to ask where.

# PLANETARY EXPLORATION

## 6 . . . . . THE MEDICAL OFFICER

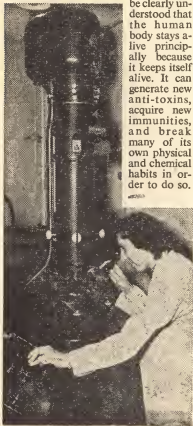
**S**O I AM TO BE THE MEDICAL OFFICER on the first spaceship to set out to reach a planet. It will be my job to keep us all alive on the way there, during our sojourn on the planet's surface and all the way back.

Now let it be clearly understood that the human body stays alive principally because it keeps itself alive. It can generate new anti-toxins, acquire new immunities, and break many of its own physical and chemical habits in order to do so.

It can even learn to turn to advantage physical and chemical circumstances which are harmful to it when first encountered. All these things it does unaided by the conscious mind of its occupant or by the aid of the medical man. Wherein, then, do my duties lie? In planning my work throughout the expedition I have certain main objectives in mind. It is for me to control such circumstances as will best help the body to keep itself alive. Medicine is for the sick. If I do my job properly there won't be any sick. Preventive medicine consists largely of keeping in mind certain fundamental laws, including the laws of hygiene, dietetics and eugenics. To be able to enforce obedience to these laws and to many others I shall need a considerable measure of authority. I, too, will have to be obedient to almost every other member of the crew, each of whom in his special realm will be a guardian of the safety of us all.

### SPACE HYGIENE

Hygeia was the goddess of health. The term hygiene has come to have a narrower meaning and we use it as embracing procedure to ensure cleanliness. Dirt has been defined as matter in the wrong place and the presence of anything in any place where it can threaten health is certainly dirtiness. George Bernard Shaw, whose "Saint Joan" is still with us, was not greatly enamoured of doctors. However, he approved of Sir Almroth Wright who agreed with him that the value of hygiene was largely æsthetic. By reducing the number of places in which living germs can lurk we do, of course, reduce the chances of infection. Equally important, however, is the fact that in clean surroundings the co-ordination between mind and body is better able to combat



infection. As far as possible I shall ensure that our craft and all its equipment is thoroughly cleaned immediately prior to sealing it for departure.

The physicist and the chemist and the biologist will all be wanting samples of air at various levels as we go out of the Earth's atmosphere. Each intake will be a potential source of infection. It has been suggested that life can be transferred from planet to planet across space by encysted primitive forms of sufficiently minute creatures. We have no guarantee that in space we shall be able to relax on the assumption that we have left behind all the sicknesses of Earth. Whenever, for any reason, there is an unsealing of any portion of the outer shell, I shall be there with what I consider to be the best possible universal germicide—irradiation. To provide such irradiation I have a tungsten arc lamp in which the tungsten used is impregnated with as many isotopes as possible of all possible elements in order to get the maximum number of wave-lengths of light from below the infra-red to above the ultra-violet. At all times all parts of the inner wall, furnishings, instruments and utensils shall be kept as clean as can be.

Even supposing that it were possible to set out in a completely germ-free vessel it would be quite impossible to bring aboard a human being completely free from germs throughout his body. Personal sanitation would, therefore, be of paramount importance. Effluents will have to be discharged very forcibly away from the ship, otherwise they will stay with it, adhering to the hull or as accompanying satellites. Water will not be available for flushing purposes, nor will load restrictions permit the carrying of any other material for ejection purposes. I have overcome these difficulties by developing a sink with a hermetically sealable lid, and in place of a normal outlet pipe a tube leading directly to the propulsion jet stream of the ship's driving power unit.

Clothes and bodies will have to be kept clean. Water will be in short supply. Nevertheless, I have ensured that each of us will be able to have a change of clothing frequently and baths as often as desired in the purest of water. The wash-house and bath-room will be fed by conditioned air which will pass through a water recovery unit before regeneration. All surplus water will be distilled, the necessary heat being readily obtainable from the power units.

#### DIETETICS

I have not worked out for each of the crew how much sugar, starch, and fat he will require to provide the calories for the physical work his particular job will require. I do aim to have an adequate supply of such foodstuffs available in palatable form. I also have arranged that his hours of duty, bright surroundings, acceptable leisure occupations and times of sleeping and eating will ensure that he will never in boredom take too much of these things, nor in frantic preoccupation take too little. In any case, for most of the crew physical work will be slight, and I am more concerned with finding ways of ensuring that they take happily adequate exercise to maintain healthy circulatory and respiratory systems with complete elimination of waste.

#### EUGENICS

Eugenics has been defined facetiously as the art of choosing one's parents wisely. In more accurate terms it is the science of the production of healthy offspring. I have checked carefully the antecedents of all members of the crew, the appointment of each of them having been conditioned on my approval from the medical point of view. I have even considered the possibility of our landing successfully on a habitable planet and being unable to return. There is no knowing how long it may be before another venture is made should this one fail. I was, therefore, at special pains to ensure that there is no consanguinity amongst us.

So far I have dealt with the measures to keep us all fit. I am also prepared, as far as possible, to deal with any disorders which may occur. Early diagnosis is always a great asset. I have stressed on everybody the importance of reporting immediately the slightest symptoms. We want no long-suffering heroes or heroines. I shall myself be watchful for signs of any lowering of health.

In the preparation of these compounds there will be a proportion of radioactive isotope atoms included for each of those elements. My last job before going to bed and my first job after breakfast will be to put each of the crew in turn in a special cylinder connected to my control panel. I shall then proceed to prepare one of the cards mentioned above, the perforations in which will be produced by



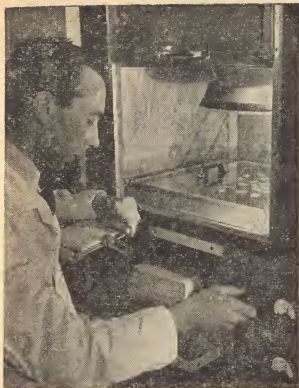
Medicine, like all other sciences, really began to get going when the techniques of measurement were brought to bear. The pulse rate measured with a watch, the body temperature with a thermometer, encephalographic determination and blood counts brought new ways of checking on the body's condition. I now have an instrument which will, in a matter of moments, produce for me a card which can give me the results of an all-embracing survey of a human body.

At 10.00 hours each of us will swallow a specially prepared tablet which will contain an assimilable compound of each of certain elements.

Impulses received in various detector units which will line the cylinder. The cards will then be fed into an electronic device and from phosphorus I shall know the condition of the teeth and bones, from cobalt the condition of the liver, from iodine glandular activity, and will similarly check up on other vital organs. The instrument will also give me blood heat throughout the body so that any local centres of inflammation will be quickly detected. I will also get pulse rate, basic metabolism rate, respiratory data, blood pressure and full statistics of every other measurable characteristic of the body of every man and woman aboard.

Continued on page 127

## A NEW TOOL FOR SCIENCE



**Measuring  
DDT  
deposits on  
leaves.**

THE SCIENTISTS AT WOODSTOCK FARM, Kent, Shell Agricultural Experimental Station in the United Kingdom, are now carrying out experiments to ascertain the amount of DDT on a leaf after spraying. This data—when allied to the “insect kill” estimates of the entomologist—will be valuable in fixing the minimum amount of DDT necessary to provide an efficient insecticide, thus achieving substantial economy in spraying costs.

The area of a specimen batch of sprayed leaves is measured by means of a photo-electric *Arealimeter*. This instrument, specially constructed by Woodstock technicians, enables the total area of the leaves to be read from

a galvanometer scale, by superimposing the black images of the leaves on a photo-electric cell. This process achieves in two minutes what formerly took two days. After measurement, the DDT is stripped from the leaves by benzene; then the benzene is removed from the DDT by evaporation in a current of air. The measuring process is facilitated by converting the DDT into a proportionate amount of sodium chloride by treatment with sodium hydroxide. Silver nitrate is then added to the sodium chloride until neutralisation is effected. The amount of DDT present is related to the amount of silver nitrate used in the neutralisation process.





# CRACK!

## TAKING BY SOUND

Here's a new way of taking pictures—if you possess the wonderful Kodak Microflash unit which gives exposures of 5-10 microseconds.

This method of photographing four (or more) stages in the smashing of an electric lamp, uses the speed of sound as the shutter-triggering device



# FLASH!

## PICTURES AND LIGHT

Delays in shutter release from first contact of hammer with lamp are made by moving microphone away from lamp. Precise adjustment gives exposure at any stage of break-up.



Technical Data:  
Exposure 5-10  
microseconds at  
f/8. Ortho-X film.  
Developed twelve  
minutes in Devel-  
oper 61A.

Photos: Kodak

## THE SCIENTISTS LIFE

### 1—THE BOTANIST

**P**LANTS RANGE IN SIZE AND complexity from bacteria to the Giant Redwoods—the former living for only a short time and the latter for thousands of years. The green scum on the pond, the mushroom, the yeast, the mosses; the organisms causing ringworm, athlete's foot, pneumonia and diphtheria—these are all plants just as much as the buttercup or oak tree. The botanist is concerned with *all* plants, not just those that look pretty in the garden! Therefore, the botanist is concerned with all those aspects of our lives in which plants play a part.

He is interested in the bacteria and fungi which break down plant and animal remains, so that they can be used again. He is also interested in the bacteria which live in the alimentary canal of humans and other animals

and help in the digestion of our food. The ripening of butter and cheese, tanning of leather, the curing of tobacco, the manufacture of alcohol and vinegar are all dependent on plants of various kinds, and for that reason come into the botanist's domain.

Reeds and canes for baskets, cotton, timber, the coconut and its products, from margarine to mats, penicillin, tea, coffee, spices and flavourings, such as pepper, cloves, vanilla and peppermint, are all plant products in common use. Seaweeds could be mentioned, too; they are useful for fertilisers, chemicals and animal fodder, as well as food for humans. If plant products are so essential and useful, then surely the botanist must be a very important person.

The agricultural botanist has run up against some

tricky problems in the past—and is certain to do so in the future. When our crops are grown so tightly packed together they are particularly vulnerable to any fungus disease or insect plague. Bacterial and fungal diseases account for many millions of pounds worth of crops every year, and anything that can be done to reduce this puts up the standard of living. The Irish potato famine of 1845-6, caused by the blight fungus, is notable, and there are many plant-caused diseases of vines and wheat that have done immense damage. The plant pathologist works in the laboratory and also in the field—he may be trying to find a new method of preventing plant disease, preparing a new fungicide or insecticide, battling with a virus. In each case he carries out experiments in the laboratory and then tries them in the field. Some research stations have an advisory service where the botanists are called in by a grower who is worried about his crops. He examines the plants, diagnoses the trouble—be it fungus, insect, virus,

bacteria or mineral lack—and then gives advice on the best treatment.

Peas, beans, lupins, clover, laburnums and so on have special nodules on their roots, containing bacteria that are able to extract nitrogen from the air and make it available to the plant. Thus, these crops, due to their high nitrogen content, actually make the soil more fertile when the plant remains are ploughed back after the crop is harvested, and such plants are the basis of the crop rotation systems. Botanists are at work here, too, finding strains of clover that will grow in hitherto unfarmed country so that animals can be kept on the poor soil. Research is being done on these lines in East Africa, now.

#### BREEDING

One of the most important aspects of agricultural botany is plant breeding. All the fruits and vegetables used today have been fostered by man—in some cases the original wild plants have been forgotten. Sometimes the breeder is out just to improve

the stock—to produce, say, a seedless fruit or a sweeter one, or a thornless rose or blackberry. Sometimes he tries to make the plant immune to a disease. This is done by hunting round the world for a wild variety of the plant that is naturally immune to the disease, and crossing it many times with the edible plant until the new one combines all the good features of the cultivated variety with the immunity of the wild. This has been done with the potato—a wild variety was found in South America, and it was crossed successfully with one of our tried favourites, resulting in a disease-free variety. Wheat, too, has been treated in this way, and wheat rust disease is nowhere near such a serious problem as it was. Russian botanists have produced drought-resistant wheats by growing standard wheat under arid conditions, and winter forms by growing it under very cold conditions. They say that wheat is growing further north now than ever before. The Russians have also “rejuvenated” wheat by crossing it with Couch Grass.

Some of the hybrids so obtained have a high yield, are resistant to shedding, their flour makes high quality bread and the disease “smut” does not harm them. Tens of thousands of acres are now sown with these hybrids.

Forestry is a growing science now, and especially in those countries where timber is an important export forestry officers are in demand. Climates, soils, pests (insect, virus, fungus, bacteria) as well as the study of the trees themselves, are all part of his syllabus, and he often has a lonely job with many square miles of territory to patrol, constantly on the lookout for diseases and pests. Trees are a long-growing crop and take many years to reach maturity. Seedlings are planted and they and the saplings are carefully looked after until the time when they come crashing down, and are floated away, perhaps to become part of the many tons of paper the world uses every day. Forests in such countries as Canada and America stretch for hundreds of miles and form a very

important part of the world's resources.

As well as what might be called the applied botanist, we have the "pure" botanist who is concerned with the plants themselves and not just how man can best use them. He tries to find out how they work, just what does happen when a seed germinates, how many chromosomes there are to a cell, how they respond to light and water lack, and what laws determine their growth.

He is still trying to find out how water travels up the plant. He knows that it enters the root by osmotic pressure—the sap in the root is more concentrated than the soil water and so it is sucked into the root. But there is no satisfactory explanation of how water gets to the top of a fir or redwood. Osmosis does not explain it, and nor does any other theory whistled up by the botanist.

#### PHOTOSYNTHESIS

Botanists are very interested in the ability of the green plant to build up sugars and starches from simple

substances like carbon dioxide and water. No animal can do this and we are all dependent on plants, directly or indirectly, for our food. The chlorophyll in the green leaves functions only in sunlight, when starch is formed—this is changed to soluble sugars at night when it is transported to the various storage organs, such as potato tubers, fruit and wheat grains. Workers in many laboratories are trying to imitate the plant and to make these foods in the laboratory. It has actually been done in America very recently, but the process is of no practical use. It is still cheaper to use the plant-made product!

Another way of tackling the food-shortage problem that the botanist is trying, is the mass culture of *chlorella*. *Chlorella* is the tiny, single-celled plant that gives its green colour to stagnant water, and research is going on to find ways of growing it in large quantities for animal food. Chickens seem to thrive on it, and its use for cattle seems a possibility. Unfortunately, man is not equipped

to digest the cellulose wall round the plant and, therefore, cannot get at the nutritious contents. Yeast is also being used in these mass culture experiments. This is especially useful to man because of its high vitamin B content.

Much research is being done on the control of flowering (i.e., what makes a plant flower when it does). It is known that the length of the day has an effect on flowering—plants are “short-day” or “long-day” ones, the first flowering in the spring or autumn and the latter in the summer. The light and dark periods can be shown to have some effect on the leaves and a substance is transmitted to growing points of the plant where buds develop into leaves or flowers according to the stimulus. We do not yet know what the substance is or how it produces its effects.

Botanical research is also going on in the medical field on the production of new antibiotics. Since penicillin (obtained from the mould *penicillium*) burst upon the world, several similar anti-

biotics, such as *auromycin* and *streptomycin*, have been discovered. They are useful in that they have a different action from that of *penicillin* and so can supplement it. Biochemists are trying to synthesise these new drugs, so that we shall not have to rely on the plants. Thus, we can see how closely the botanist and chemist work together, a fact that will be brought out more clearly in further articles in the series about the lives of scientists.

Plant geography is another topic avidly studied by botanists. They list the species found in each area and note the temperature, rainfall, height above sea level and time of year. Where heavy rainfall occurs, plants called *epiphytes* live on tree trunks. Some of these have no underground roots and collect their water in their leaves—thus plenty of rain is essential. Desert plants have especially thick skins and are modified in other ways to help to conserve moisture. Those living near the poles have a very short season when the temperature is high enough for

growth—they must germinate, flower and produce seeds in this time if they are to survive.

The form of the plant can be altered radically by altering the conditions under which it is grown. The biggest factor is light, and if plants are grown in the dark they have long, pale stems and small leaves. Botanists have found that they become green if exposed to only one hour's light a day. Water supply comes next in importance, those grown without much water being stunted and having small leaves. Temperature has a big effect on form and so have various nutrients in the soil. Everyone with a garden knows this, of course, but the botanist who finds out *why* these things have the effect they do, will, helped by the botanist studying plant geography, give us a

much deeper understanding of the way a plant lives.

Many investigations into the laws of heredity are still done on plants, like the very first such experiments. All our knowledge of how characters can be passed on to children from parents was learnt in the beginning from garden peas, and from these experiments has grown our science of genetics. It is a nice answer to those who say the "pure" botanist is wasting his time.

Like all other scientists, the botanist is ultimately concerned with the explanation of the universe under one all-embracing general law. His particular area of enquiry is plants. About these he establishes general biological laws that will fit into the whole great pattern of science.



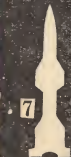
# BRUSH U ROCKET RE

(Identification)



# UP YOUR COGNITION

n on page 126)





JOHN  
MORTIMER

# Travellers Tale

by  
**AUBREY  
BURL**

Nobody ever believed the Baron—until now . . .

**N**OBODY WILL BELIEVE THIS. Nobody can. It's not even scientific—or if it is then it must be the most slovenly piece of science ever. It began because we had no proper bathroom.

We were in the Tyrol collecting geological specimens. Each evening we returned to our hut tired, hungry and always dirty from rock-climbing. So while Chris, my husband, sorted out the day's collection I would wash.

To wash we had to get water from the nearest stream, warm it and then scrub and dress rapidly before frost bite set in. We could also bath, if things were so drastic, in an outshed where someone had left a hipbath. Over it hung a bucket suspended from the roof and from the bucket hung a piece of string. If we wanted a shower we filled the bucket, sat in the bath and pulled the string. The bucket upset, the water spilled out and we got soaked.

That evening I did want a shower. I was sick of scrabbling up scree-slopes, I was fed up with everything, and I was covered with scraped-in dirt. It was even a dirty evening, with storm-clouds coming in from all directions. So I started boiling water in pails and

saucepans while Chris, realising I was definitely dispensable for the rest of the day, went to look at just one more outcrop.

By standing on a chair with no seat I managed to fill the bucket with warm water. Then I filled the bath beneath it until the outshed was murky with steam. I placed my clothes very carefully on the same sad chair and took to the bath like a hippo to the swamp. I wallowed, soaped, wriggled and crooned. The string dangling from the bucket kept tickling my nose but by then I was so happy it made me giggle and wallow all the more. Through the steamed-up window the sky was patchily dark with the sunset splashing across it like a blood-stained hand. I was feeling good enough to be romantic even.

Slowly the water was cooling. It was time for the shower. Experience had shown that if you sat in the bath and pulled the string you got one great dollop of water and no more. But if you stood up and pulled the string gradually the water streamed over your head and you got a rinse from eyebrows to ankles in the bath. Much more satisfying.

I stood up and took hold of the

string. And the lightning struck just then. With a huge flash. I stood there with my right arm raised and must have stood there motionless in the steam for a quarter of a minute. Not thinking anything. I was terrified. It was only the next crash of thunder that made me look round to see if everything, including me, was all right. Then I saw the man.

I was so surprised that all my thoughts jammed together. "It's Chris, no it's not, his clothes are funny, he's a peasant, they're too good for peasant's clothes, he's by the wall farthest from the door, what's he doing here, I'm standing up with nothing on, who is he, I'm standing up with nothing—oooooh." And I collapsed into the bath.

Have you ever tried holding bath-water up round your neck for protection? It's frustrating. I huddled in that bath, covered only in embarrassment. The man spoke. I couldn't understand a word. He spoke again, apparently in another language. I still couldn't understand.

"Good Lord," I said to myself, "he's a Martian, and that wasn't thunder and lightning. That was his rocketship coming down. No wonder I can't understand him."

I tried to make signs showing friendship while maintaining modesty. This also was difficult. The man helped me by passing the towel from the chair. I draped it round my shoulder and, feeling like Pocahontas at a pow-pow, started to talk to him.

"After all," I said to myself, "Martians are hyper-intelligent. He'll be able to translate earth language easily. Let's start him off on a basic vocabulary." I wished Chris would come back.

I pointed to myself. "Woman," I said to the man, who was still half-hidden in the steam, and I pointed to myself. "Woman."

"Vuhman—frow—vuhman," he said and smiled. At least, I think he smiled.

"Water," I said, dabbling my hands in it, "water."

"Vorter—vasser—vorter," he said.

A suspicion came over me that I didn't like. Perhaps I had been right about a peasant.

"Germany," I said, pointing north.

"Germany—doichland—Germany," he said and came up to the bath.

Now he was close I found I had been right about the clothes. He had a pair of knee-fitting breeches on and a three-quarter length coat, and a silk waistcoat and a long, lacy cravat. It wasn't a peasant's costume but clothes worn in the eighteenth century. This man was an elderly German from a party in one of the bigger hunting lodges. And he'd come into our hut and frightened me to death and made me think of Martians, and had stood looking at me in the bath for a good five minutes.

"Get out," I shouted. "You dirty-minded, pauncy beast, you . . ."

"Please, madame," he said, "permit, please, that I explain and then I will go if I can." He spoke in English.

"I don't need explanations. You can give them to my husband if you stop. What do you mean—if you can go?"

"I am not what you think. I don't know where I am. And I'm not certain if I can go back to where I started. My English is all right, is it not?"

I took no notice of that.

"You're not so far from Finstermunz," I said, "and you can get back to anywhere on earth from there if you wait long enough."

"The longer I wait the more difficult it will be. What is the year?"

"Just after six o'clock," I replied, vaguely, before the question really shocked me. "Did you say, what year?" Drunk or mad, I'll have to humour him, I thought. I told him the year.

He took out a large watch.

"Then it's ten minutes and over one hundred and fifty years since I started," he said.

The bath water was cold but not half as chilly as the dribble of fear down my back. MAD MONSTER OF THE

MOUNTAINS. ANOTHER MURDER IN THE BATH. I saw the headlines. I didn't like me in the mortuary. I clutched the towel around me as though it were chain mail.

"I think I hear my husband," I said, and wished I did.

"Please don't be alarmed. If you will let me explain you will see that it is I that is alarmed. I am not lost in way, I am lost in time. I tried an experiment in 1788 at six o'clock and now I am here. It is alarming. But please do not be scared for you. Just let me explain."

He pointed to the corner of the shed.

"I have a kite here with a small key attached after the manner of Mr. Franklin. You have a string and a bucket, and your feet in the water. Perhaps," he suggested, "we are in rapport."

With one small towel between me and Eve I found the suggestion indelicate. I asked him about his experiment, hoping the steam round the bath would linger.

"The earth travels in one direction only," he went on, "and so surely must time do also. The solid world and eternity travel together. Now is not all matter electrical?"

I thought the atmosphere would be positively electrical if Chris found us together like this. I said nothing.

"So, although the earth can never reverse its direction," said the man, "electricity can. In storms lightning goes many ways and maybe time also. The earth moves clockwise and I wished to move anti-clockwise, and so perhaps move backwards in time. I so wished to see Julius Caesar, I hoisted my kite in a storm and hoped that lightning and time would work together, leaving the world behind. You follow?"

I told him I followed only dimly, and that he was lucky he wasn't a cinder and that his reasoning didn't seem safe to me.

"But I'm here," he replied, "even though I appear to have moved forward. But how am I going to get back? And shall I not require exactly the

same force of electricity to get me back as brought me here?"

"I don't know," I said. "I can't even mend fuses. But it may be that you, in some strange way, acted as a transformer, in which case your body will have precisely the same reaction to electricity on the way back. You will return to the place and time from which you started. At least, I think so."

He smiled again. He was a soldierly man and had the appearance of one who had travelled a great deal. I rather liked him, though I thought he regarded his very unmethodical experiment with far too much complacency.

"And then," I said, "you can publish a book telling of your success and——"

But he was shaking his head violently. He looked angry.

"No," he muttered. "No book. No. There will be no book. I hate words. Books, they are lies. Everybody makes lies in books. No book."

"Why not?" I asked. "I should have thought you would have wanted to tell everyone of this voyage."

"I have travelled much. Once someone wrote a book about me, telling of my travels. Everyone laughed at it. No one will laugh again. No book."

He stamped off to the corner of the shed, picked up a flimsy kite and went out of the door. Still clutching my bath towel, I followed him. I was so wet and cold already that the rain made no difference. In any case I couldn't understand why one book that got a bad reception should make him feel as bitter as that. After all, this was time travel. Unscientific, maybe, but with analysis, surely reducible to something logical and possible to everyone. And, perhaps he had some apparatus he had not mentioned.

He was letting the kite-string out. Any moment now the lightning might strike that key and he would be gone

Continued on page 127



## FICTION

**KEMLO AND THE MARTIAN GHOSTS** is another title in the Kemlo series written by E. C. Elliott. Kemlo and his fellows, you will remember from our review of *Kemlo and the Sky Horse* in No. 54, were born on a space station and can live in space without space suits or oxygen. This one, like the other, is a fantastic tale. It has strange invisible ghosts on Deimos and a lot of rays. It is frankly juvenile and most of the characters are boys; but it seems to us unnecessarily warlike for such people. People from Earth and from Kemlo's satellite set out to investigate Deimos and Mars. They blaze a trail of glory. The book is well produced for 5s. from Nelson (Parkside Works, Edinburgh).

The science fiction in **THE SKY PIRATES** is, to say the least, very hazy. The story is mainly

about a boy who wanders in the Syrian desert looking for his Arabian foster-mother. He is captured by the pirates and is instrumental in bringing about their defeat. The pirates' stronghold is in the desert and most of the story's action takes place there, too. There are some miraculous ships and flying space suits, but practically no other science fiction occurs in the book. It is by Douglas V. Duff and is published by Blackie (16 William IV Street, W.C.2) at 5s.

**CHILDREN OF THE VOID** is a sequel to *World in Eclipse* (reviewed in No. 52), both books written by William Dexter. *World in Eclipse* was the story of the slow rise of a few people on a devastated Earth; the present book continues their slower rise. It brings in such things as The Wise Ones, bat-men and Varang-Varang. It is written in diary style. The authenticity

of *World in Eclipse* seems to be lacking here; the whole thing seemed rather far-fetched to us. It is published by Peter Owen (50 Old Brompton Road, S.W.7) at 10s. 6d.

CATEGORY PHOENIX contains three very good stories. They are: *Firewater* by William Tenn, *Category Phoenix* by Boyd Ellenby, and *Surface Tension* by James Blish. The first is about strange alien-converted humans who have remarkable powers, and a man who makes money out of them. The title story concerns a dictator and his categories (Office-Theatre-Linguistics-Research) and one of the research chemists who discovers immortality. The last story is about lowly animals with human minds and ambitions. The book is edited by E. F. Bleiler and T. E. Dikty. It is published by The Bodley Head (28 Little Russell Street, W.C.1) at 9s. 6d.

THE MAN WHO SOLD THE MOON has turned up from time to time in a number of guises, but none of them as good value as the latest edition, put out by Pan Books (8 Headfort Place, S.W.1) at 2s. The book contains six stories which form the first of

Robert A. Heinlein's "Future History" series. It covers the period to the end of this present century. *Life-Line* is about a machine that foretells times of death. *Let There be Light* deals with a discovery for making cheap lighting. *The Road Must Roll* is a story about the conveyor-belt type of roads in the future. *Blow-Ups Happen* is an atomic pile story. The title story and its sequel, *Requiem*, is about a big business man who succeeds in buying the Moon by a trick of law, helped by clever advertising. His one aim is to land on the Moon—and he only just makes it. All the stories are first rate.

THE YEAR OF THE COMET, we would say, is the best book yet written by John Christopher. This may be because in it he has moved somewhat away from his usual microcosmic canvas and has portrayed his characters among the full picture of the world around them. The story is about the future. Wonderfully free from gadgets, it traces the life of a scientist who holds in his mind a discovery that can give world supremacy to any of the "managerial" groups that control the world. This is big stuff, of course, but the



scientist, being human, attaches more importance to a personal matter. His girl has been kidnapped, apparently, and he wants to find her. The dust jacket says that the book—as well as being fine entertainment—is a sincere attempt to classify the problems of our own time, to illuminate the cold war of ideas and ideals and, in the unexpected climax, to suggest a solution. This attempt succeeds—except here and there where a certain amount of biassed over-simplification of the problems and distortion of the ideals occurs. As to the suggested solution—well, of course, there *are* others. We recommend this book most highly as an example of mature, intelligent and splendidly-written science fiction. It comes from Michael Joseph (26 Bloomsbury Street, W.C.1) at 12s. 6d.

Christopher's book is one of the series of Novels of Tomorrow that Josephs are putting out under the general editorship of Clemence Dane. Another in the series is *THE BRIGHT PHOENIX* by Harold Mead. Here the civilisation that we know has been blasted out of existence by atomic

warfare. What follows is a variation on *Animal Farm*, without the animals. But the treatment is quite fresh and original. The book is a worthy member of the series. It also costs 12s. 6d. from Michael Joseph.

*GATEWAY TO THE STARS* is editor John Carnell's third anthology of British science fiction. It is fully as good as the others, and in some ways is better. There are nine stories, some by well-known and old-established authors like J. T. McIntosh and John Christopher; others by some of the newer authors. One thing that stands out very clearly is that these "young" science fiction authors do not lag behind the more famous, either in ideas or quality of writing. Indeed, the reader unschooled in authors' names would have difficulty in deciding which were which—and would, we think, often be wrong! All these stories are well worth preserving between hard covers, and we thoroughly recommend the book. (By the way, Christopher's story is reprinted from *Authentic*.) It comes from Museum Press (26 Old Brompton Road, S.W.7) at 9s. 6d.

## NON-FICTION

Everything about CINE-BIOLOGY is excellent except the title. One would expect it to be a book about the making of biological films, whereas it is a book about biology based upon biological films—a sort of scientific “Book-of-the-Film.” Given that misnomer—and the lesser one that the book is concerned solely with animals, and might, therefore, be *Cine-Zoology*—we can go on to say that authors Mary Field, J. Valentine Durden and F. Percy Smith have done a wonderful job. As they say in their preface, biology is often written up in a most boring fashion, with all the stuff of life swamped in useless technicalities. Here, however, the text is exciting and attractive. The more unusual invertebrate animals are dealt with, such as worms, spiders, sea urchins, liver flukes, coelenterates. A wealth of photographic illustrations—taken from the films, of course—form a most instructive supplement to the text. In short, the book is highly recommended and is well worth the 2s. 6d. charged for it by Penguin Books (Harmondsworth, Middlesex.)

Another good Penguin book (this time costing 2s.) is No. 35 of SCIENCE NEWS. The excellent expert articles in this number include: *How We Form Concept*, *Finding out about Fundamental Particles*, *Meson Theory of Nuclear Physics*, *Polarography*, *Adaptations in Diving Mammals*, *Freeze-Drying*, and the usual erudite *Research Report*. There is something here for everybody. This number also contains the index to Nos. 32-35.

THE HYDROGEN BOMB by James Shepley and Clay Blair, which we reviewed at length in No. 55, has now been published in this country at 12s. 6d. by Jarrolds (11 Stratford Place, W.1). You will remember that this book tells the story behind the development of this terrible weapon—not in technical terms, but in terms of the human jealousies and rivalries and intrigues that charged the laboratory atmosphere more sinisterly than the radio-dust from the very bomb itself. Here, unfortunately, we find proof that scientists are by no means unattracted by worldly values. As we said before, this book should be read by everyone who cares.



# Projectiles

## OVERSEAS SECTION

### IDEAS

I come from Austria, therefore, excuse my English if it is not one hundred per cent. There is one thing that I disagree with—that is your cover picture of No. 50 (Venus). In my opinion Venus is in the state Earth was in when the oceans were formed. A long time ago, Venus' temperature was hotter than 100° C., and all the water was gaseous and mixed with the atmosphere. Gradually the planet cooled off and huge clouds were formed during the night, and later, also in the daytime. And, of course, rain started contemporarily. Thus Venus is at present sufficiently cooled down, that there is a thick layer of clouds around the whole planet. Continually rain pours down forming oceans—a situation we on Earth had millions of years ago. The surface would consist of lakes, torrential rivers, mud and volcanic rocks, rounded off by rain and tremendously forceful storms. The atmosphere would

be some nitrogen and very much CO<sub>2</sub>, ready to be used up by plants, which will develop in the future.

Jupiter will be in an even younger state; methane and ammonia which are bound on Venus, are still free in the atmosphere and volcanic activity is at its peak, but I don't know about the ice you mentioned in your cover picture in Issue No. 51. I fully agree about the description of Mercury and Mars. There is one article I would like you to publish: an article discussing the nature of the fourth dimension. I worked it out all by myself, while I had a walk all over Bassendean. Later I found out somebody else had the same idea before. Well here it is: Every one of you has heard strange things about the fourth dimension. Stories about ships that vanish or similar things, but few of you really know what it really is. Well, here is one way to explain it: Imagine a circle. The circumference of it is a one-dimensional body. You can only go forward or backward along it, but it is bent into a second dimension. Take as example a fish in a creek that goes in a circle. It lives in only one dimension and can never reach the centre of the circle. Next take the

surface of Earth and a wolf as example. The wolf lives actually in two dimensions, because he can't fly or climb. So the surface of the Earth is two-dimensional, but bent into a third dimension, and the wolf can never reach the centre of it. For our next step we take the universe as we know it and a spaceship. Like the fish moves in only one dimension, the wolf in two, the spaceship will travel in three dimensions only. And the entire universe is bent round a centre, which we will never be able to either see or reach.

Another theory: Our universe is in the state of an explosion away from the centre I mentioned, and like a circle getting larger, the further it goes away from its centre, the universe is growing all the time. And it is that centre of the universe where God is to be found, for that is the spot where everything has been created.

Herwig H. Menzel,  
30 Villiers Street, Bassendean,  
Western Australia.

*Well now, Herwig, that's a nice interesting letter. But how do you account for the fact that Venus is nearer the Sun than we are, yet Jupiter is much further away—how is it that they are both younger than Earth?*

*As for your ideas about the fourth dimension, we are not at all sure that we follow them. Certainly they are at variance with Einstein's ideas. He believed that time is the fourth dimension. What do you think about that?*

## SERIALS

Please do not, as another reader suggested, put a serial in your book. It has spoilt *Galaxy* and *New*

*Worlds*, so don't let it spoil *Authentic*! Could you help me contact some other fans interested in S.F. and stamp collecting? I congratulate you on your good mag, and please, do keep up the good work.

Fred Parker,  
c/o Hammondville P.O., N.S.W.,  
Australia.

*Oh, dear, Fred! We've been and gone and disappointed you. Unfortunately you are in the minority. Anyway, maybe you'll get some pen pals to make up for it.*

## INITIATIVE

Although I have been reading *Authentic* since the small numbers I can honestly say that No. 52 was far away the best yet. Now for one or two grouses. What was the point of E. C. Tubbs's "Star Haven?" You describe it in your editorial as "thought-provoking"—I found it just the opposite. So a bunch of pseudo-soldiers are landed on an alien world. So they get strife in the ranks. So they revert to Nature. So what? They are not the first lot that has gone "troppo" on overseas duty.

Next for showing—Sydney J. Bounds' "John Brown's Body." I have a prediction to make—I know who will win that war—the Martians! If anyone has time to sit and work it out he will find that I am correct. No army, in the past, present or future can afford to take away a man's initiative. You may take away his individuality, you may train him 'til he won't even breathe without permission, but once he ceases to think for himself—you can wave the white flag, because your army is finished. The "robot" soldier, when fired on, will

not take cover unless told to, and when his target disappears—he stops firing. What chance has he got against man, Martian or not, who is fighting on his own soil—fighting for a cause, and equipped with cunning initiative, and a knowledge of terrain and conditions? What chance? Not a chance in the world!

So much for that. I hope in future Mr. Bounds alters his military tactics. Congratulations for "Cleansing Fires" and "A Date With the Past"—they were really first class. The articles, too, were up to standard. Please keep up the good work!

John L. Birkett, OR's Barracks,  
Narrow Neck Camp,  
Auckland, N.Z.

*But don't you see, John—that is what Bounds was saying. Whether or not any present member of the world's armies is a robot is beside the point. The point is that military discipline can to a large extent sap initiative. As you say, and as the story said, if this tendency is taken too far, the army will be largely ineffective. And the robot soldier will take cover. He'll take cover whenever conditions seem to arise under which he has been trained to take cover. That is not initiative—but it is what most present-day soldiers would do!*

### YOUNG CLUBS

I am a seventeen-year-old boy, here in Sweden. I have read *Authentic* for a long time now, and am now going to write a letter to you. I like your paper very much. Only one of the Swedish fanzines is in so high a class as yours. No, I did not mean fanzine, but journal! (I do not know if that is the right

word.) All your short stories, and articles, are very fine. But now shall I give you a report from the S.F. life here in Sweden? The real S.F. is not old. It began about 1953-54. Before this time, we had had only books and so on. Nineteen hundred and fifty-four began the journal *Hapna!*, which is "Wonder" in English. In the same year started all the S.F. clubs of Sweden, and so did ours. It is called "Cosmos Club"; a simple and nice name, is it not? From the beginning we were only three members, I myself and two other boys, Lars-Erik Setterborg, fifteen years old; and Hans Siden, eighteen years old. We read books, wrote short stories, and in April started the first Swedish fanzine, "Cosmos News." It was only published in one issue, but we began and that is fine, is it not? "*Ut desint vires tamen, est laudant volunta.*" But we went on with the club, contacted other clubs, and started in May the Union of Science Fiction. It contains today the following clubs: Cosmos Club, Utopia, Meteor, The Future and Space Club and two others will be with us from April. That is not bad when you think of our age. Our club contains ten members. I am the chairman, and Setterborg is the secretary of our club. A boy named Lage Heden is our librarian and cashier. We have a library of 50 volumes, novels and anthologies. We have a telescope, too, which enlarges a 100 times. Not bad, or what do you say? We have our meetings on Mondays at 8 o'clock, and there we speak, read and make our new paper, which WILL out. Then we do a plenty other things. Now you have heard something from us. We should like, if it is possible, to see all, or a part

of, the American fanzines. If you would send us them, you should see ours. If you will publish in *Authentic* I should be very glad, and if you would give me some addresses of American S.F. clubs, I should be much gladder. Is the last word right spelt, I wonder?

Lars-Erik Helin, Kaggledsgatan 8, Gothenburg, Sweden.

*This is very interesting, Lars, and we hope you'll keep us informed of Swedish fan activities. We don't doubt that other clubs all over the world will now get in touch with you. Meanwhile, here are some American fan club addresses:*

*The Star Rocket S.F. Correspondence Club, Raleigh E. Multog, Jr., 7 Greenwood Road, Pikesville 8, Md.*

*The Connecticut Science Fiction League, John Ring, 301 Central Ave., Norwich, Conn.*

*The International Science Fiction Correspondence Club, Ed. Noble Jr., RFD 1 Townline Road, Erie, Pa.*

*Hyperspace, John L. Magnus, Jr., 9612 Second Avenue, Silver Spring, Maryland.*

wonder if any of your other readers have noticed this? I do not wish to accuse Mr. Rigby of plagiarism, and I can appreciate how difficult must be the pursuit of originality; but I feel it would be wise in the budding writer (as in the budding research worker) to familiarise himself at the outset with the best and accepted work already done in his field, and thus avoid working out for himself things which have already been tried.

Miss M.J.W., Ayrshire.

(Name and address withheld by request.)

*That's the plague upon authors, Miss W. Your idea of reading up stuff does not really help. You can't possibly read all there is. We had read Robbie, and though there is a similarity, we would not call it striking. Still, people differ . . .*

## CLUB?

I wonder if there are any fen in this area interested in forming a club; if there are, perhaps they would communicate with me.

N. Brock, The Green, Aston Abotts, Aylesbury, Bucks.

*If your club gets under way, Mr. Brock, don't forget to let us know how it progresses. Good luck!*

## HOME SECTION

### PLAGUE

My purpose in writing to you is to call your attention to the very striking similarity between the winning entry in your readers' story competition and the chapter entitled "Robbie" in "I, Robot" by Isaac Asimov. Although "Parting" has a different ending, the resemblance between the two in other respects will not be denied. I

### ESP

Since I read a S.F. story centred around telepathy and a book or two on kindred subjects, I have been keenly interested in extra sensory powers and have had many arguments about the existence of these powers. I would like to see, in a series of articles, the evidence

for and against presented by a reputable psychical research scientist, preferably a member of the Society for Psychical Research.

J. A. Dudleston,  
23 Allerton Grange Drive,  
Leeds 17, Yorks.

*We are bearing your suggestion in mind, Mr. Dudleston—though there are so many books on this subject that we may have to decide against it. Thanks for writing, anyway.*

### BACK NUMBERS

I am trying to obtain some back issues of *Authentic* and I wondered if you or some of your readers might be able to help me. The Nos. I want are 2, 3, 6, 10, 12 and 21. If I manage to get these I will have a complete collection of *Authentic*. Keep up the good work with *A.S.F.* You have the best S.F. mag on the market and I hope to see it stay there a long time.

Derek Newman, 13 Longcroft Lane,  
Welwyn Garden City, Herts.

*Hope you get them, Derek, but we don't hold out much hope.*

### BARGAIN

Just a line or two to let you know I am still a regular reader of *ASF*, and I'm glad to say still enthusiastic. However, I must sound a mournful note—from my point of view, that is to say—the reason being due to the fact that I am, by virtue of my present employment, somewhat of a globetrotter. Thus it is for lack of space in my boxes and trunks when on the move, I cannot carry accumulations of books and much is my sorrow that it should be so. I must, therefore, dispose of my small collection of back numbers, which are in perfect condition, and also a few odd copies of other publications, also in fair shape. For those who are interested I have *Authentic* 31, 34, 36 and 39 to 53 inclusive; *Astounding* Vol. X, 5 & 6; *Sprague de Camp's New Anthology*; *Space Time Task Force* by Preston Yorke; and *From Unknown Worlds*, an anthology of modern fantasy for grownups. All these for 1s. per copy or £1 the lot. Any offers? 921 Sgt. Dunham, A., 71 A.M.Q., R.A.F., Feltwell, Nr. Thetford, Norfolk.

*Well, well! Here's a bargain for somebody! And a chance to start or complete a collection. Carry on, sergeant—and try not to be swamped.*

### ROCKET IDENTIFICATIONS

- |                    |                        |
|--------------------|------------------------|
| 1. British Stoooge | 6. French E.C.A.       |
| 2. Swiss Oerlikon  | 7. German Wasserfall   |
| 3. American Bumper | 8. American Little Joe |
| 4. French Matra    | 9. British V.T.O.      |
| 5. American Gorgon | 10. German Rheinbote   |

## Planetary Exploration

Continued from page 102

With all these precautions I am not very worried about the incidence of any of the terrestrial diseases, but in any case I shall be carrying an adequate supply of specifics with which to remedy any of them effectively with early diagnosis.

The bodily disorders about which I must confess to a degree of anxiety are not those due to organic infection, but those due to purely physical causes. Notable among these are the effects of cosmic rays, absence of Earth's magnetic field, and other unknown influences which may permeate the ship's hull and crew's clothing. In collaboration, the physicist, the chemist, the biologist and myself have prepared equipment for the detection of such things. We have also a range of materials for screening, and devices have been installed for deflecting all such particles as high altitude research has shown to be probably out there waiting for us.

The pessimists have warned us of perilous alien diseases waiting for us when we land. I am not alarmed. It is highly improbable that we shall encounter living creatures whose blood stream is sufficiently comparable with our own for it to be a host for any organism which could infest the living human body. I like honey and frequently consume it with no fear that I shall contract Isle of Wight disease, so harmful to bees.

## TRAVELLER'S TALE

Continued from page 117

for good. I was certain that he was not keen to try the experiment again.

"Please," I said. "Please, either stay and meet my husband or promise me you will write a book."

He shook his head.

"I must go," he shouted, "or the storm may go. Goodbye, madame, and forgive me for intruding."

This was ridiculous. Why was he so touchy about this other book I wondered. And maybe he would write a book that would lie obscure in some foreign library for me to find if only I knew his name.

"Then what is your name?" I cried.

Lightning split the skull of the sky. He drew himself up straight and proud. There was a blast of thunder. The grass was alive with rain.

"I am the Baron Munchausen," he called.

For a second I puzzled. Until I remembered. Munchausen the traveller. "Munchausen's Travels," that collection of highly-improbable stories. Munchausen with his exaggerated and impossible tales. All the world had laughed at Munchausen the Liar.

"No one would believe me," he yelled. And disappeared.

As I said—nobody will believe this.



# THE HAPPY ENDING to the SMOKING HABIT



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